

Z 402 151 293

US Postal Service  
**Receipt for Certified Mail**

Jackson A. Ransohoff, President  
Neutron Products Inc.  
22301 Mount Ephraim Road  
Dickerson, Maryland 20842

Postage	\$
Certified Fee	
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Return Receipt Showing to Whom & Date Delivered	
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PS Form 3800, April 1995

Is your **RETURN ADDRESS** completed on the reverse side?

**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return the card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

94-025-A NOV

**3. Article Addressed to:**

Jackson A. Ransohoff, President  
Neutron Products Inc.  
22301 Mount Ephraim Road  
Dickerson, Maryland 20842

**4a. Article Number**

7402151 293

**4b. Service Type**

- ☐ Registered  
☐ Express Mail  
☒ Return Receipt for Merchandise  
☐ Certified  
☐ Insured  
☐ COD

**7. Date of Delivery**

7-16-95

**8. Addressee's Address (Only if requested and fee is paid)**

**5. Received By: (Print Name)**

**6. Signature: (Addressee or Agent)**

*Jackson A. Ransohoff*

PS Form 3800, December 1994

EKN

102965-00-8-0229

Domestic Return Receipt

Thank you for using Return Receipt Service.



# MARYLAND DEPARTMENT OF THE ENVIRONMENT

2500 Broening Highway • Baltimore Maryland 21224  
(410) 631-3000 • 1-800-633-6101 • <http://www.mde.state.md.us>

Parris N. Glendening  
Governor

Jane T. Nishida  
Secretary

JUL 14 1999

## **CERTIFIED MAIL: NOTICE OF VIOLATION**

Jackson A. Ransohoff, President  
Neutron Products Inc.  
22301 Mount Ephraim Road  
Dickerson, Maryland 20842

**RE: Radioactive Material License Number: #MD-31-025-01**

Dear Mr. Ransohoff:

This letter refers to the radioactive materials inspection conducted by Messrs. Bob Nelson, Alan Jacobson, and Ray Manley of the Maryland Department of the Environment's (MDE) Radiological Health Program (RHP) on March 16, 18, and 19, 1999. The inspection examined radiation safety, compliance with conditions of your license, adherence to procedures and proper maintenance of records, interviews with personnel, general observations, and independent measurements.

During the inspection, certain activities were found to be in violation of the Department's requirements. The findings were either discussed with Messrs. Marvin Turkanis, Jeffrey Williams, and Billy Ransohoff at the licensee management exit interview conducted on March 19, 1999 and with Mr. Jeffrey Williams by telephone on May 18, 1999. The violations found are listed in the enclosed "Description of Violations."

In addition to the violations found, the RHP has identified the following programmatic issues and radiation safety concerns:

1. NPI personnel have still not demonstrated National Institute of Standards and Technology (NIST) traceability of your calibrator source (Cobalt-60, M-498, 6.10 millicuries) which they use to calibrate approximately 65 radiation survey meters and 46 self reading dosimeters. This issue of concern was identified during the March 25, 26 and April 2, 1998 radioactive material inspection, and described in the Department's June 30, 1998 letter, and still remains unresolved. Furthermore, NPI personnel could not demonstrate the accuracy of their conductivity meter. Finally, NPI did not possess or use a calibration standard, and, a calibration record was not available for inspection.



2. The licensee has still not obtained the permits necessary to begin construction of the courtyard enclosure. Radiation levels at the boundary of the plant and concentrations of cobalt-60 in soils exceed regulatory requirements. NPI has been storing the radioactive waste that was generated as a result of source manufacturing activities. In fact, NPI has only shipped for disposal, a small fraction of the radioactive waste that it has generated over the past three decades.
3. NPI continues to have unresolved compliance issues and radiation safety concerns regarding all four of your Maryland radioactive materials licenses. Furthermore, NPI does not have a full time Health Physicist on staff and your Health Physics Consultant, who only spends a few days per month on site, has not been effective in resolving these issues and concerns. The Department is concerned because it appears that NPI management does not have the technical expertise, financial resources and commitment towards radiation safety to effectively implement critical aspects of an adequate radiation protection program necessary to establish compliance with State Regulations and license conditions.
4. The Limited Access Area (LAA) of the plant, equipment, tools, storm water system, dry pond, adjacent railroad property and soils, both on and off site, are contaminated with cobalt-60. The RHP estimates that it will cost millions of dollars to remediate contaminated areas of the plant and property. Your company filed for bankruptcy protection in 1986 and evidently, your debts still remain unresolved. NPI has still not met financial assurance requirements for decommissioning in regards to three of your Maryland radioactive materials licenses to which the regulation pertains. Finally, your company does not maintain adequate documents which describe your radioactive waste management plan or plan of corrective action regarding the dozens of ongoing violations of Maryland radiation protection regulations and programmatic radiation safety concerns.

As a result of these findings, you are required to respond to this letter and the enclosed "Description of Violations" within twenty (20) calendar days of your receipt of this notice. Written statements should be provided for each of the violations indicating:

- a. Corrective steps, which have been or will be taken by you to remedy the present violations and the results achieved or anticipated;
- b. Corrective steps which will be taken to avoid further violations, who will undertake these steps, and who will supervise them; and
- c. The date when full compliance will be achieved.

Failure to provide these statements in the required time frame may result in the Department taking escalated enforcement action under Maryland Radiation Regulations to:

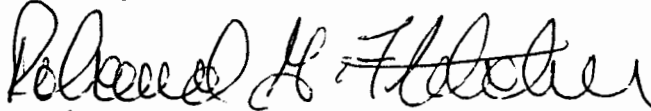
- (a) modify, revoke or suspend your license,

- (b) issue a Departmental Order under the Annotated Code of Maryland, Environment Article, Sections 1-301 and 8-101 through 8-601, and
- (c) seek an administrative penalty of up to \$1,000 per violation, per day [Section 8-510(b)], or a civil penalty in an amount not exceeding \$10,000 per violation, per day [Section 8-509(b)].

The serious nature and the extent of the deficiencies noted with your radiation safety program requires that you schedule an enforcement conference at the Agency's headquarters no later than thirty (30) days after your receipt of this letter, at which time, upon review of your compliance response, remedial actions can fully be discussed. Please indicate in your response who will be attending the meeting representing NPI.

Please be reminded that Departmental compliance letters and licensee responses shall be posted pursuant to the requirements of the Maryland regulations, Section J.11(d) titled, "Posting of Notices to Workers." Should you have any questions concerning this letter, please contact Messrs. Carl E. Trump, Jr., Bob Nelson, or me, at (410) 631-3301.

Sincerely,



Roland G. Fletcher, Environmental Manager  
Radiological Health Program

*CET*

RGF/CET/RKN/cc

Enclosure:                      Description of Violations

## **DESCRIPTION OF VIOLATIONS**

Neutron Products Inc.  
22301 Mount Ephraim Road  
Dickerson, Maryland 20842

**RE: Radioactive Material License Number: MD-31-025-01**

Certain activities conducted under your license were found to be in violation of the Code of Maryland Regulations 26.12.01.01 titled, "Regulations for Control of Ionizing Radiation." These violations are presented below:

1. Section D.501 titled "Surveys and Monitoring-General" requires in part that each licensee shall conduct surveys that are necessary to evaluate radiation levels and concentrations of radioactive material. License amendment 33, Item N dated May 23, 1989 requires in part that all soils exhibiting levels of radioactivity in excess of 8 picocuries per gram above background, for an equivalent area of 30 ft by 30 ft wherever found, shall be removed and properly stored/disposed of by the licensee. The gamma exposure rate at one meter above the ground surface shall not exceed 10 microR/hr above background for an area greater than 30 ft by 30 ft and shall not exceed 20 microR/hr above background for any discrete area.

Contrary to the requirements of Section D. 501 and license amendment 33, the analyses of soil samples collected by RHP Inspectors from the dry pond and the adjacent railroad property collected on March 16 and 18, 1999 indicate that the soil concentration for cobalt-60 contamination exceeded 8.0 picocuries per gram. These contaminated areas of the dry pond and the adjacent properties are greater than 30 ft by 30 ft. The licensee failed to conduct soil samples and analysis to accurately determine the status of compliance during the years of 1997 and 1998. During the inspection, RHP Inspectors collected random soil samples from the far side of the dry pond and the adjacent railroad property. The samples were analyzed by the Maryland Laboratory Administration's Radiation Chemistry Laboratory who determined the cobalt-60 soil concentrations to be 186.6 and 101.4 picocuries per gram respectively. The licensee has still not removed soil contaminated with cobalt-60 from the adjacent railroad property to establish compliance with the 8.0 picocurie per gram soil concentration limit. The Stipulation and Settlement (Civil Case No. 76639 in the Circuit Court for Montgomery County) dated January 3, 1994 required the licensee to clean all contaminated soils areas by June 15, 1994. The licensee failed to meet this deadline and is refusing to remediate this property. Furthermore, the dose rate at one meter above the ground surfaces of the dry pond and adjacent areas exceeds the

dose rate limit of 10 micro R/hr above background. The RHP has determined the dose rate at two locations at the boundary of the dry pond to be approximately 531 millirem per year and 342 millirem per year. The fence surrounding the dry pond was constructed such that it does not prevent or adequately discourage unauthorized access. During the April 1997 inspection, the RHP Inspectors found evidence that soil contaminated with cobalt-60 was removed by an unknown person other than the licensee. The licensee did not submit the design to the RHP for approval prior to construction and this issue still remains unresolved. This is a **REPEAT** and ongoing violation.

2. Section D.101, titled "Radiation Protection Programs" requires in part that each licensee shall use all means necessary to maintain radiation exposures to levels as low as reasonably achievable.

Contrary to Section D.101, the licensee failed to maintain radiation exposures to members of the public living near the plant to levels as low as reasonably achievable (ALARA). This is a **REPEAT** violation from previous inspections. The RHP measured approximately 202 millirem per year at the portico of a resident's home, 353.0 millirem per year on the lawn of a nearby resident and 150 millirem per year next to the home located on this property. The RHP has identified the waste storage rooms as the source of these elevated radiation levels in the community. NPI continues to store quantities of radioactive waste. In fact, the licensee has only shipped for disposal, a small fraction of the radioactive waste that they have generated over the past three decades.

3. Section D.501, titled, "Surveys and Monitoring-General" requires in part that each licensee make or cause to be made surveys as may be necessary to evaluate the extent of the radiation hazards that may be present and to establish compliance with these regulations.

Contrary to Section D.501, the licensee failed to conduct radiological surveys in the courtyard area of the LAA sufficient to determine the presence of leaf debris, which contained elevated levels of cobalt-60. RHP Inspectors collected a sample of this debris, which contained a cobalt-60 concentration of approximately 7704.8 picocuries per gram. The RHP has long identified this area as a potential release point where radioactive materials exit the plant in an uncontrolled manner.

4. Section D.101, titled "Radiation Protection Programs" requires in part that each licensee shall use all means to maintain radiation releases of radioactive material to levels as low as reasonably achievable.

Contrary to Section D.101, the licensee failed to use all means necessary to control releases of radioactive material from the Limited Access Area (LAA) to levels as low as reasonably achievable (ALARA). Cobalt-60 contamination continues to be found outside of NPI's boundary thus substantiating the loss of control of a hazardous

radionuclide. Two soil samples that inspectors collected from the unrestricted side of the LAA fence contained cobalt-60 soil concentrations measured to be 167.7 and 103.5 picocuries per gram. Soil samples that were collected by the railroad tracks near the road and adjacent to the fence on the outside of the drypond measured 96.3 and 21.7 picocuries per gram respectively. The soils in the dry pond and adjacent railroad property contain concentrations of cobalt-60 that exceed regulatory requirements. This is a **REPEAT** and ongoing violation.

5. License amendment 33, Items C.1 and C.4 requires in part that a Department approved Health Physics Consultant conduct monthly evaluations and submit monthly reports to the Department based upon such evaluations. Section C.31 titled "Specific Terms and Conditions of Licenses" requires in part that each licensee shall be subject to all rules, regulations and orders of the Agency.

Contrary to Section C.31 and license amendment 33, the licensee failed to submit the Department Approved Health Physics Consultant's monthly reports to the Agency during the third and fourth quarters of 1998 as required. This is a **REPEAT** violation from prior inspections.

6. Section D.501 titled "Surveys and Monitoring-General" and license amendment 33, item D.6 requires in part that the licensee shall conduct monthly floor monitoring within the entire facility.

Contrary to Section C.31, Section D.501 and license amendment 33, monthly floor surveys of the plant were not conducted in August and September 1998.

7. Section D.1103 titled, "Records of Surveys" requires in part that each licensee shall maintain records of the results of radiation surveys required to demonstrate compliance with regulatory limits and item D.6. of license amendment 33:

Contrary to Section C.31 and D.1103, records of the floor monitoring surveys, which were conducted during the months of March-July, 1998, were not maintained or available for inspection.

8. License Amendment 33, Item I and NPI's Random Inspection Program dated May 14, 1993 requires in part that the Radiation Safety Officer implement random inspections of the LAA and unrestricted areas on a monthly basis.

Contrary to Section C.31 and license amendment 33, a monthly audit of the LAA was not conducted as required for August 1998. This is a **REPEAT** violation from the April 29-30, 1997 Departmental Inspection. The RHP is further concerned that the Random Inspection Program is still not effective in resolving items of noncompliance and radiation safety concerns.

9. License Amendment 33 Item D.8 and NPI's one kilometer survey plan requires in part that the licensee conduct monthly surveys of residential properties located within the one kilometer radius of the plant.

Contrary to Section C.31 and the one kilometer survey plan approved by the RHP and license amendment 33, radiological surveys of residential properties located within the one kilometer radius of the plant were not conducted in June and July 1998. Furthermore, the majority of the residential properties in this area have never been surveyed for radiological contamination.

10. Section D.401 titled, "Testing for Leakage or Contamination of Sealed Sources", and license condition 12 requires, in part, that each sealed source with a half-life greater than 30 days be leak tested at intervals not to exceed six months.

Contrary to the requirements of Section D.401 and License Condition 12, the licensee failed to test each sealed source for leakage or contamination within the required six (6) month frequency. Specifically, the licensee did not conduct any leak tests of their sealed source inventory (sources not transferred to an authorized recipient) during the year of 1998, a time period greater than six months. Additionally, leak tests were not conducted in 1999 until the day the inspectors requested access to these records for examination.

11. Section D. 1104 titled "Records of Tests for Leakage or Contamination of Sealed Sources" requires in part that records of leak tests required by Section. D.401 shall be maintained for inspection by the Agency. Section A.4 titled, "Records" requires in part that each licensee shall maintain records showing the receipt, inventory, transfer, and disposal of all sources of radiation. Section A.5 titled "Inspections" requires in part that each licensee shall make available, upon inspection by the Agency, records maintained pursuant to these regulations.

Contrary to Sections D.1104, A.4 and A.5, records of leak tests, which were conducted during the years of 1990 to 1997, were not available for inspection. Additionally, records of shipments, receipt and transfer of radioactive sources were not adequate and readily available for inspection. Inventory of radioactive materials was maintained in a computerized database, which evidently was not updated and maintained on a regular or frequent basis. As a result, these records were not readily available for inspection in a timely manner in that NPI spent several hours creating material inventory record when it was requested by RHP inspectors for review.

12. Section D.1108 titled, "Records of Dose to Individual Members of the Public" requires in part that each licensee maintains records sufficient to demonstrate compliance with Section D.301 which describes the dose limit for individual members of the public.



Contrary to Section D.1108, the licensee failed to maintain records sufficient to demonstrate compliance with the 100 millirem per year dose limit for individual members of the public for the year of 1998. At the exit interview, the Radiation Safety Officer described the manner in which NPI can demonstrate compliance with Section D.301 titled, "Dose Limits for Individual Members of the Public". However, a written document describing this evaluation or a record demonstrating compliance by measurement, calculation or appropriate simulation model, using recent radiation monitoring data, was not available for review during the inspection.

13. License amendment 33, item 13.L dated May 23, 1989 requires in part that the radiation levels at the boundary of the facility shall not exceed 500 millirem per year.

Contrary to Section C.31 and license amendment 33, the licensee failed to comply with the 500 millirem per year boundary limit. The RHP measured 531 millirem at the fence of the dry pond for the year of 1998.

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MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
RADIATION LABORATORY REPORT  
(410) 767-5537

SAMPLE SOURCE: NPI COLLECTOR: Jacobson/Nelson SAMPLE TYPE: Soil  
COLLECTION DATE: 03/16,03/18/99 RECEIPT DATE: 03/19/99 REPORT DATE: 03/29/99 ANALYSES BY: Wise/Hegde  
*L. Wise*

LAB. NO.	Sample Type	Location	<sup>60</sup> Co pCi/g
1767	Soil	Courtyard	7.7679 x 10E+03 ± 3.3262 x 10E+02
1767L	leaves	Courtyard	7.7048 x 10E+03 ± 3.7174 x 10E+02 *
1767S	Soil	Courtyard	1.3406 x 10E+04 ± 5.9065 x 10E+02 *
1768	Soil	Sewer Element LAA	1.2035 x 10E+01 ± 6.9293 x 10E-01
1769	Soil	Outside LAA Fence	1.6775 x 10E+02 ± 7.3845 x 10E+00
1770	Soil	Outside Fence	1.0352 x 10E+02 ± 4.7674 x 10E+00
1771	Soil	Outside Dry Pond	2.1690 x 10E+01 ± 1.0100 x 10E+00
1772	Soil	RR Tracks Near Road	9.6314 x 10E+01 ± 4.5014 x 10E+00
1773	Soil	RR Property Near Pond	1.0141 x 10E+02 ± 4.4152 x 10E+00
1774	Soil	Dry Pond	7.6286 x 10E+01 ± 3.7762 x 10E+00
1775	Soil	Dry Pond - Far Side	1.8664 x 10E+02 ± 8.3409 x 10E+00

## Note:

\* Low weight and not all soil or leaves.

FROM: OMNIFAX

TO:

410 631 3198

APR 9, 1999 9:45AM #380 P.02

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

PAGE 1 OF 6

SEALED SOURCE TYPE:

Irradiator Source

MODEL:

Dwg A200234-D

MANUFACTURER/DISTRIBUTOR:

Neutron Products, Inc.  
22301 Mt. Ephraim Road  
P.O. Box 68  
Dickerson, Maryland 20842-9703

ISOTOPE:

Cobalt-60

MAXIMUM ACTIVITY:

22,000 Curies (814 TBq)

LEAK TEST FREQUENCY:

6 months

PRINCIPAL USE:

(M) Gamma Irradiator, Category IV

CUSTOM DEVICE:

X  YES

NO

CUSTOM USER:

Neutron Products, Inc.  
22301 Mt. Ephraim Road  
P.O. Box 68  
Dickerson, MD 20842-9703

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

PAGE 2 OF 6

SEALED SOURCE TYPE: Irradiator Source

DESCRIPTION:

The source consists of 4 assembly holders, with each holder contain 25 pairs of alternately stacked Co-60 wafers and spacer rings. There are 2 slits in each holder to minimize self-attenuation. The holders are stacked within a single inner capsule which is sealed within an outer capsule. Both the inner and the outer capsules are fabricated from 321 type stainless steel tubing and rod. All seals are accomplished by tungsten inert gas welding. Each Co-60 wafer is 0.745 inches (18.92 mm) in diameter and 0.073 inches (1.85 mm) thick; each assembly holder is 3.825 inches (9.72 cm) long and 0.812 inches (2.06 cm) in diameter; the active length of the source is 15.3 inches (38.86 cm); the inner capsule is  $16.125 \pm 0.05$  inches ( $40.96 \pm 0.13$  cm) long; and the overall length of each source is  $18.45 \pm 0.05$  inches ( $46.86 \pm 0.13$  cm) and is 1.0 inches (2.54 cm) in diameter

LABELING:

The source is labeled with "NPI-XX" and the serial number only. Any other labeling was considered impractical. "XX" is the year of fabrication.

DIAGRAM:

See Attachments 1 and 2.

CONDITIONS OF NORMAL USE:

The source will be used in a panoramic gamma irradiator (with wet source storage) for the irradiation of biological and other materials by the custom user. Use conditions should not exceed those specified for ANSI classification 43424.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999 PAGE 3 OF 6

SEALED SOURCE TYPE: Irradiator Source

PROTOTYPE TESTING:

Prototypes were tested in accordance with standards set forth in ANSI Standard N542 for the classification of sealed sources. The recommended required test levels for these sources are 43424; the actual performance of the prototypes was 53525. There were no failures at any test level.

QUALITY ASSURANCE AND CONTROL:

Material selection, inspection, testing and fabrication is the same as the NPI sources in the Source and Device Catalog which includes tubing and end cap shock tests and analysis; evaluation of 5 sequential prototype welds to qualify each weld configuration; preparation and evaluation of a dummy weld after each 10 sources; and, helium bubble and wipe testing of the inner and outer capsules with surface contamination not to exceed 0.05 microcuries (1,850 Bq) for the inner capsule and 0.005 microcuries (185 Bq) for the outer capsule. Source activity is determined by comparing the exposure rate generated by the source standard. The procedure used has determined source activities which have been correlated when tested by other procedures and users.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- A. While not necessarily required, the manufacturer recommends:
1. Avoiding the following:
    - a. prolonged storage in water with a resistance lower than 10,000 ohm-centimeters;
    - b. prolonged use or storage in still air;
    - c. prolonged storage in the proximity of mild steel, brass or other dissimilar metals.
  2. That sulfuric acid be used in lieu of hydrochloric acid in storage pool demineralizer resin systems.
- B. NPI source drawing A200234D is to be distributed only to individuals having a specific license issued by the NRC or an Agreement State.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

PAGE 4 OF 6

SEALED SOURCE TYPE: Irradiator Source

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE (Cont'd):

- C. Installation, dismantling, relocation, repair, initial testing, replacement and/or disposal of the source shall be performed in accordance with the terms and conditions of a specific license issued by the NRC or an Agreement State.
- D. Upon routine quality control inspection by the manufacturer, microcracking in the welds was noted. Further review of this problem revealed that the discovered microcracking is a phenomenon commonly associated with the welding of 321 stainless steel alloy. Subsequent intensive testing and analysis of the microcracking as referenced in References D through I indicated that no significant problems attributed to the observed microcracks should exist for at least 2,000 years.
- E. Prior to transferring the sources to a licensee other than the named custom user, it is recommended that a detailed metallurgical engineering evaluation be performed to determine the integrity of the transferred sources. Special attention should be given to the growth of the noted microcracks.

SAFETY ANALYSIS SUMMARY:

The Model Drawing A200234-D source is no longer manufactured or distributed by Neutron Products, Inc. and Process Technology is no longer in business. This source was transferred to the Radiation Technology, Inc. and then to the manufacturer in 1995. Therefore, the registration certificate is being converted to an inactive registration certificate.

The source was originally approved for licensing purposes by the Arkansas Division of Radiation Control and Emergency Management Programs. Because of the limited information available on this source, no safety evaluation of the device was performed as part of the conversion of the certificate to inactive status.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

PAGE 5 OF 6

SEALED SOURCE TYPE: Irradiator Source

REFERENCES:

- A. Letter from Neutron Products, Inc. to Radiation Technology, Inc. dated December 30, 1981 and signed by Marvin M. Turkanis.
- B. Letter and enclosures from Neutron Products, Inc. to Radiation Technology dated February 2, 1982 and signed by Marvin M. Turkanis.
- C. Letter from Neutron Products, Inc. to the Arkansas Department of Health dated February 17, 1982 and signed by Marvin M. Turkanis.
- D. Crack Propagation Analysis dated March, 1982 and prepared by Ray Fasiczka of O'Donnell and Associates, Inc.
- E. Memorandum from Julius Heuschkel to Marvin Turkanis through Ray Fasiczka dated March 22, 1982.
- F. Letter from O'Donnell and Associates to Marvin Turkanis dated March 29, 1982.
- G. Letter from Marvin Turkanis to Ted Russer dated March 30, 1982.
- H. Letter from Marvin Turkanis to Bernard Bevill dated April 2, 1982.
- I. Letter from Martin A. Welt to Bernard Bevill dated April 2, 1982.
- J. Letter (and enclosed memorandum dated April 13, 1982) from Donald A. Nussbaumer to E. Frank Wilson dated April 22, 1982.
- K. Neutron Products, Inc. drawing Number A200234-D dated December 29, 1981, sheets 1 of 2 and 2 of 2.

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

PAGE 6 OF 6

SEALED SOURCE TYPE:

Irradiator Source

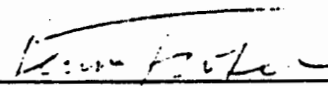
REFERENCES (Cont'd):

- L. Letter from Marvin Turkanis to Bernard Bevill dated April 1, 1982.
- M. Letter from Marvin Turkanis to Bernard Bevill dated September 26, 1983.

ISSUING AGENCY:

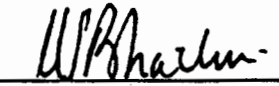
U.S. Nuclear Regulatory Commission

Date: July 26, 1999

Reviewer: 

Seung J. Lee

Date: July 26, 1999

Concurrence: 

Ujagar S. Bhachu

9

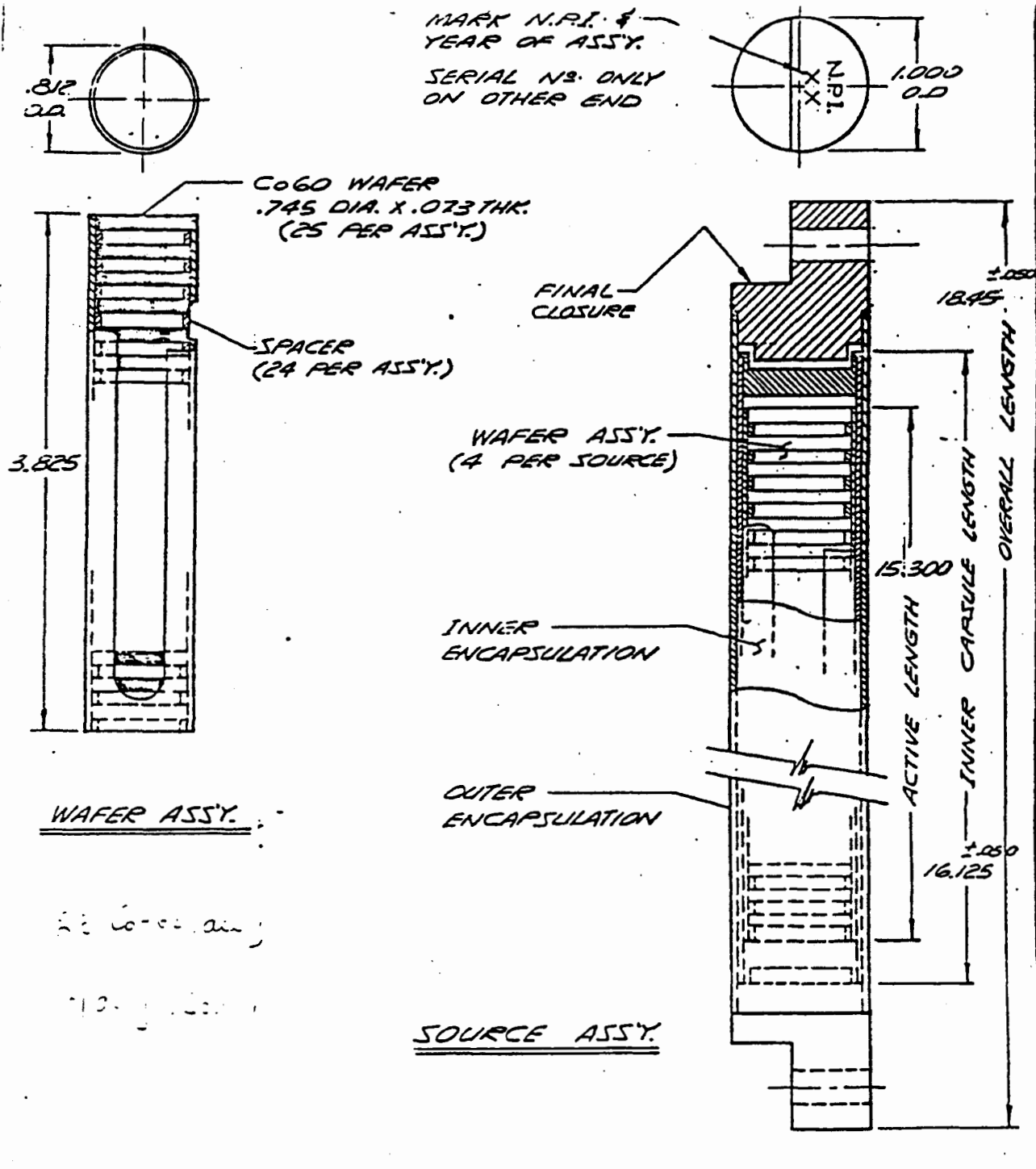


REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

NO: NR-474-S-801-S

DATE: July 26, 1999

ATTACHMENT 1

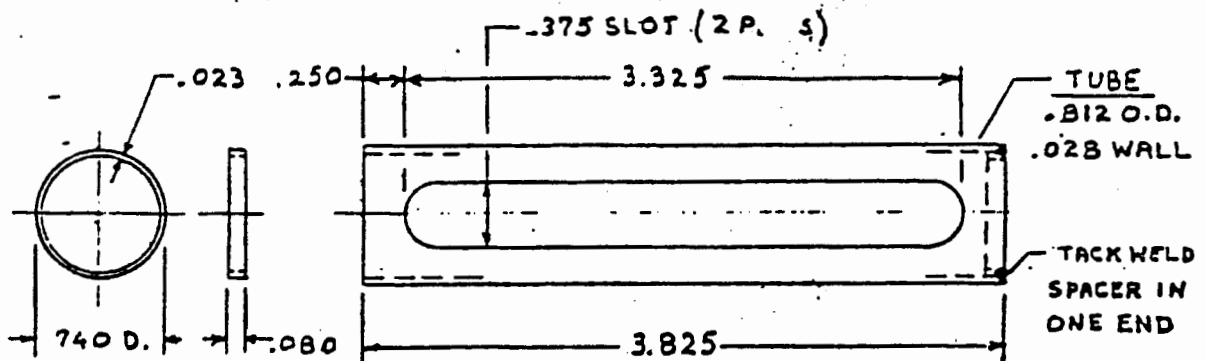


REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES  
SAFETY EVALUATION OF SEALED SOURCE

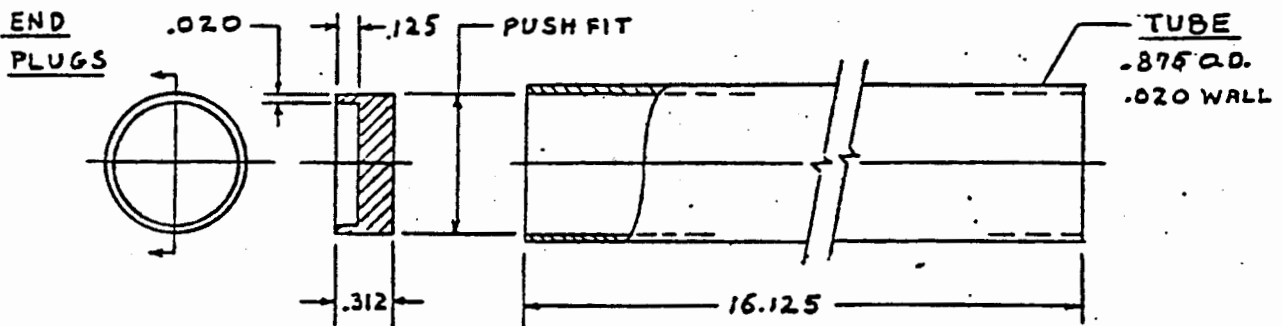
NO: NR-474-S-801-S

DATE: July 26, 1999

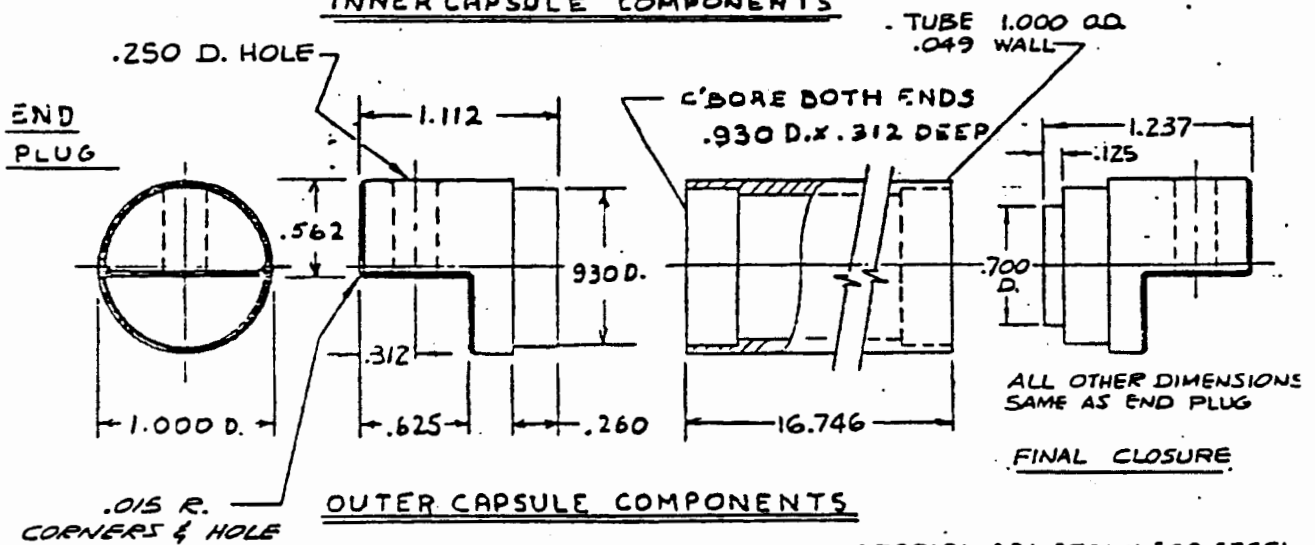
ATTACHMENT 2



WAFER ASS'Y COMPONENTS



INNER CAPSULE COMPONENTS



OUTER CAPSULE COMPONENTS

ALL OTHER DIMENSIONS  
SAME AS END PLUG

FINAL CLOSURE

ALL MATERIAL 321 STAINLESS STEEL

17

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
RADIATION LABORATORY REPORT  
(410) 767-5537

SAMPLE SOURCE: NPI COLLECTOR: Jacobson/Nelson SAMPLE TYPE: Soil  
COLLECTION DATE: 03/16,03/18/99 RECEIPT DATE: 03/19/99 REPORT DATE: 03/29/99 ANALYSES BY: Wise/Hegde  
*L. Wise*

LAB. NO.	Sample Type	Location	<sup>60</sup> Co pCi/g
1767	Soil	Courtyard	7.7679 x 10E+03 ± 3.3262 x 10E+02
1767L	leaves	Courtyard	7.7048 x 10E+03 ± 3.7174 x 10E+02 *
1767S	Soil	Courtyard	1.3406 x 10E+04 ± 5.9065 x 10E+02 *
1768	Soil	Sewer Element LAA	1.2035 x 10E+01 ± 6.9293 x 10E-01
1769	Soil	Outside LAA Fence	1.6775 x 10E+02 ± 7.3845 x 10E+00
1770	Soil	Outside Fence	1.0352 x 10E+02 ± 4.7674 x 10E+00
1771	Soil	Outside Dry Pond	2.1690 x 10E+01 ± 1.0100 x 10E+00
1772	Soil	RR Tracks Near Road	9.6314 x 10E+01 ± 4.5014 x 10E+00
1773	Soil	RR Property Near Pond	1.0141 x 10E+02 ± 4.4152 x 10E+00
1774	Soil	Dry Pond	7.6286 x 10E+01 ± 3.7762 x 10E+00
1775	Soil	Dry Pond - Far Side	1.8664 x 10E+02 ± 8.3409 x 10E+00

## Note:

\* Low weight and not all soil or leaves.

FROM: OMNIFAX

TO:

410 631 3198

APR 9, 1999 9:46AM #380 P.02



DEPARTMENT OF THE ENVIRONMENT  
RADIOLOGICAL HEALTH PROGRAM  
RADIOACTIVE MATERIAL LICENSE

Page 1 of 1 pages

License No: MD-31-025-04

Amendment No.: 23 code 02305

Neutron Products Inc.  
22301 Mt. Ephraim Road  
P.O. Box 68  
Dickerson, Maryland 20842

In accordance with the inspection that was conducted on February 3, 5 and 6, 1998, and your compliance response dated April 21, 1998, Radioactive Material License Number MD-31-025-04 is amended as follows:

Condition 24: to add compliance response dated April 21, 1998 is incorporated into your license.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date: April 29, 1998

A handwritten signature in cursive script, reading "Roland G. Fletcher".

Roland G. Fletcher  
Radiological Health Program Manager II



DEPARTMENT OF THE ENVIRONMENT  
RADIOLOGICAL HEALTH PROGRAM  
RADIOACTIVE MATERIAL LICENSE

Page 1 of 9 pages

Pursuant to the Maryland Radiation Act, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Maryland State Department of the Environment, now or hereinafter in effect and to any conditions specified below. In accordance with application dated June 12, 1987, with attachments, Radioactive materials license is renewed, subject to Department revision in its entirety.

LICENSEE		3. License No. MD-31-025-04
1. Name Neutron Products, Inc. 22301 Mt. Ephraim Road P.O. Box 68		4. Amendment No. 22
2. Address Dickerson, Maryland 20842-0068		5. Expiration Date November 30, 2000
6. Radioactive material (element and mass number) A. Cobalt-60	7. Chemical and/or physical form A. Doubly encapsulated sealed sources which meet one of the following: (1) NPI, Inc custom sealed sources which have been doubly encapsulated in accordance with Neutron Products, Inc. procedure No. R5006, Rev. 0; or,	8. Maximum amount of radioactivity which licensee may possess at any one time A. 2,000,000 curies;  (1) No source to exceed 15,000 curies.

9. Authorized Use



DEPARTMENT OF THE ENVIRONMENT  
RADIOLOGICAL HEALTH PROGRAM  
RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

License No. MD-31-025-04

Amendment No. 22

CORRECTED COPY

6. Radioactive material  
element & mass number:

7. Chemical and/or  
physical form:

8. Maximum amount of radioactivity  
which licensee may possess at any  
on time:

A.(2) NPI, Inc. model NPRP-  
610-14L & NPRP-635-25L;  
all radiation processing  
sources shall have the  
NPRP designation & be  
engraved with a serial  
number per NPI drawing  
200200 dated 11/17/78.

A.(2) No source to exceed 30,000  
curies per linear foot.

9. Authorized use of material:

For use in the water pool irradiator designated and known as "Dickerson II" for the  
irradiation of materials whose degree of flammability hazard does not exceed specifications  
0, 1, or 2 of the National Fire Protection Association's Fire Protection Guide on Hazardous  
Material (latest edition), and which are not explosive.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



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Amendment No. 22

6. Radioactive material  
element & mass number:

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200200 dated 11/17/78.

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0, 1, or 2 of the National Fire Protection Association's Fire Protection Guide on Hazardous  
Material (latest edition), and which are not explosive. Irradiation of food for human  
consumption is prohibited.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



DEPARTMENT OF THE ENVIRONMENT  
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RADIOACTIVE MATERIAL LICENSE

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Supplementary Sheet

License No. MD-31-025-04

Amendment No. 22

CORRECTED COPY

CONDITIONS

10. The authorized place of use is the licensee's address stated in Item 2. The licensee must notify the Radiological Health Program 30 days prior to vacating a permanent use address as is required by Section D.1301 of COMAR 26.12.01.01.
11. A. The radiation protection program shall be under the supervision of Joannes C. Tang. In order to qualify as a radiation safety officer or alternate radiation safety officer, individuals must be qualified irradiator operators. The Radiation safety program under this license shall be conducted in accordance with Neutron Products license MD-31-025-01.
- B. Radioactive material shall be used by, or under the supervision of Joannes C. Tang.
- C. The programmer shall be used by only an instrument control specialist:
1. whose training shall be verified, and whose familiarity with the license shall be certified in writing and reviewed annually by the radiation safety officer; and
  2. only under the direct supervision and in the physical presence of persons listed in Condition 11B.
- D. Radioactive material may also be used by persons certified in writing that they are qualified as operators in accordance with Neutron Products, Inc. procedures incorporated by reference in Condition 24 of this license except as specified in Condition 11C of this license.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II





DEPARTMENT OF THE ENVIRONMENT  
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**RADIOACTIVE MATERIAL LICENSE**

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Supplementary Sheet

License No. MD-31-025-04

Amendment No. 22

**CONDITIONS**

10. The authorized place of use is the licensee's address stated in Item 2. The licensee must notify the Radiological Health Program 30 days prior to vacating a permanent use address as is required by Section D.1301 of COMAR 26.12.01.01.
11. A. The radiation protection program shall be under the supervision of Joannes C. Tang as radiation safety officer with Frank Schwoerer as alternate radiation safety officer. In order to qualify as a radiation safety officer or alternate radiation safety officer, individuals must be qualified irradiator operators. The Radiation safety program under this license shall be conducted in accordance with Neutron Products license MD-31-025-01.
- B. Radioactive material shall be used by, or under the supervision of Joannes C. Tang or Frank Schwoerer.
- C. The programmer shall be used by only an instrument control specialist:
1. whose training shall be verified, and whose familiarity with the license shall be certified in writing and reviewed annually by the radiation safety officer; and
  2. only under the direct supervision and in the physical presence of persons listed in Condition 11B.
- D. Radioactive material may also be used by persons certified in writing that they are qualified as operators in accordance with Neutron Products, Inc. procedures incorporated by reference in Condition 24 of this license except as specified in Condition 11C of this license.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



DEPARTMENT OF THE ENVIRONMENT  
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**RADIOACTIVE MATERIAL LICENSE**

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CORRECTED COPY

**CONDITIONS CONTINUED**

- E. Maintenance and all other functions involving the Dickerson II (D-II) irradiator shall be performed by persons certified in writing by the D-II Radiation Safety Officer as being qualified to perform such activity. This condition (11-E) applies to but is not limited to, the following: radioactive source transfer into D-II, radioactive source loading onto source trees, radioactive source tree exchange, quarterly maintenance, sampling, analysis and other tests.
12. The licensee shall comply with provisions of Part D, "Standards for Protection Against Radiation" and Part J, "Notices, Instructions and Reports to Workers; Inspections" of the Maryland Regulations 26.12.01.01 "Regulations for Control of Ionizing Radiation".
13. Sealed sources containing radioactive material shall not be opened.
14. The irradiator shall be operated only in modes where at least one door of each set of entrance/exit double doors remains closed and locked at all times when the source plaque is not in its shielded storage position in the water pool, and where all other entrance and/or exit doors remain closed and locked at all times when the source plaque is not in its shielded storage position in the water pool. Opening one door at a time of each set of entrance/exit double doors while the source is "up" is permitted only to allow passage of product carriers.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

\_\_\_\_\_  
RADIOLOGICAL HEALTH PROGRAM MANAGER II



DEPARTMENT OF THE ENVIRONMENT  
**RADIOLOGICAL HEALTH PROGRAM**  
**RADIOACTIVE MATERIAL LICENSE**

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Supplementary Sheet

License No. MD-31-025-04

Amendment No. 22

**CONDITIONS CONTINUED**

- E. Maintenance and all other functions involving the Dickerson II (D-II) irradiator shall be performed by persons certified in writing by the D-II Radiation Safety Officer as being qualified to perform such activity. This is in addition to meeting other criteria established by the licensee in the license application and submittals to the Department listed in Condition 24. This condition (11-E) applies to but is not limited to, the following: radioactive source transfer into D-II, radioactive source loading onto source trees, radioactive source tree exchange, quarterly maintenance, sampling, analysis and other tests.
12. The licensee shall comply with provisions of Part D, "Standards for Protection Against Radiation" and Part J, "Notices, Instructions and Reports to Workers; Inspections" of the Maryland Regulations 26.12.01.01 "Regulations for Control of Ionizing Radiation".
13. Sealed sources containing radioactive material shall not be opened.
14. The irradiator shall be operated only in modes where at least one door of each set of entrance/exit double doors remains closed and locked at all times when the source plaque is not in its shielded storage position in the water pool, and where all other entrance and/or exit doors remain closed and locked at all times when the source plaque is not in its shielded storage position in the water pool. Opening one door at a time of each set of entrance/exit double doors while the source is "up" is permitted only to allow passage of product carriers.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



DEPARTMENT OF THE ENVIRONMENT  
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**CONDITIONS CONTINUED**

15. After installation of sealed sources in the irradiator, a radiation survey shall be conducted with the source plaque loaded and in its up, operating position to determine the maximum radiation levels in each area adjoining the radiation cell and the labyrinths. Such surveys shall be conducted:

- (A.) prior to the initiation of any irradiation of materials after the initial loading of the source plaque;
- (B.) prior to the initiation of any irradiation of materials after any increase in the total curie loading of the source plaque greater than ten (10%) above the previous highest total curie loading of the source plaque at which time a full survey was required; and
- (C.) without product or any other materials (except empty product carriers) in the irradiator cell or labyrinths which would add to the inherent shielding of the permanent physical structures of the irradiator.

A detailed report of the results of the survey shall be sent to Program Manager of the Radiological Health Program at 2500 Broening Highway, Baltimore, Maryland 21224 not later than twenty-five (25) days following initial installation of sources in the source plaque and following any increase greater than ten percent (10%) in the total curie loading of the source plaque.

16. No physical radiation barriers of the irradiator (which includes but is not limited to plugs, penetration shields in the mechanical equipment room) shall be removed, replaced, or modified in any manner without written approval of the Department.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II

**RADIOLOGICAL HEALTH PROGRAM  
MARYLAND DEPARTMENT OF THE ENVIRONMENT  
2500 Broening Highway  
Baltimore, Maryland 21224  
(410) 631-3302**

**RADIOACTIVE MATERIALS INSPECTION REPORT**

Neutron Products, Inc.  
22301 Mt. Ephraim Road  
P.O. Box 68  
Dickerson, MD 20842

License Number: MD-31-025-01

Phone Number: (301) 349-5001

FAX Number: (301) 349-5007

**Introduction:**

On March 25, March 26 and April 2, 1998, Messrs. Bob Nelson, Ray Manley, Ms. Donna Thim and I conducted a routine unannounced radioactive materials inspection at NPI's Dickerson facility. The inspection examined radiation safety, compliance with conditions of the above referenced license, adherence to procedures, proper maintenance of records, interviews with personnel, general observations and independent measurements. Five items of noncompliance and two issues of concern were identified. These findings were discussed with Messrs. Jackson Ransohoff, Jeffrey Williams and Michael Repp at the licensee management exit interview which was held on April 9, 1998. These findings will also be described in a Departmental Letter-Notice of Violation.

**Program:**

This license authorizes NPI to possess a maximum of 3,000,000 Curies of cobalt-60 for the manufacturing of special form sealed sources, removal of encapsulation and melting of unsealed cobalt-60 to fabricate teletherapy sources. The licensee stated that for one day during the month of March 1998 they possessed 1,950,000 Curies which is the highest activity ever documented on the "01" license. NPI employs 60 persons at the Dickerson plant and also maintains three other Maryland radioactive materials licenses as described below:

MD-31-025-03	Installation and Service of Teletherapy Sources
MD-31-025-04	Dickerson II Pool Irradiator
MD-31-025-05	Dickerson I Pool Irradiator

**Purpose And Scope:**

The purpose of the inspection was to examine the licensee's use and control of radioactive material relative to Maryland radiation protection regulations and specific license conditions. The inspection staff implemented a performance based inspection plan which emphasized the achievement of quality in all facets of inspected operations.

## Interviews:

Interviews were conducted with the following employees:

Jackson Ransohoff	President
Jeffrey Williams	Radiation Safety Officer
Michael Repp	Health Physicist
Jeffrey Corun	Hot Cell Manager
Joe Weedon	Manager-Limited Access Area (LAA)
Kathy Bupp	Health Physics Technician

## Specific Areas of Review:

The following areas were inspected and reviewed: Dosimetry, Random Inspection Program, Quarterly Audits, Radiation Safety Committee Activities, Respiratory Protection Program, Inventory of Radioactive Materials, Daily Implementation of the Radiation Safety Program, General Operations in the LAA, Decommissioning Recordkeeping, Boundary Monitoring Program, One Kilometer Surveys, Shipping and Receiving (Cobalt-60), Cobalt-60 in Soil, Floor Monitoring, Health Physics Monthly Reports, Disposals, Training, Air Monitoring, Survey Meter Calibration, Water Monitoring, Emergency Generator Use and Operations, Status of Building Permit Application, Annual Reports and previous violations.

## Results:

### 1. Monthly Audits **VIOLATION**

The Inspection Team reviewed records of monthly audits for the year of 1997 and year to date 1998. Several were missing. At the exit interview, NPI acknowledged that they did not conduct audits for the months of April 1997, July, 1997 and January, 1998. Furthermore, NPI management did not review the monthly audits at the required quarterly frequency. On October 31, 1997, NPI reviewed the monthly audits from August 1996 to October 1997. NPI management did not review the monthly audits for November 1997 and December 1997. This is a repeat violation from the April 1997 inspection. In NPI's Response Letter dated July 16, 1997 (which responded to violations and concerns identified during the 4/97 inspection), Mr. Williams indicated that they were in compliance with these requirements; however, they are still in violation.

### 2. Cobalt-60 Soil Concentration **VIOLATION**

NPI has still not removed contaminated soil from the adjacent railroad property to establish compliance with soil concentration limits describe in Condition 13.N. (Amendment 33). The Stipulation and Settlement (Civil Case No. 76639 in the Circuit Court for Montgomery County) dated January 3, 1994 required NPI to clean contaminated soils by June 15, 1994. NPI has missed this deadline and is refusing to remediate this property. Furthermore, NPI is refusing to inform this property owner regarding the cobalt-60 contamination that was released from their Dickerson facility. This is a repeat and ongoing violation.

### 3. Storage and Control of Licensed Radioactive Material **VIOLATION**

On April 2, 1998, I observed an unlocked Sea Land Container in NPI's parking lot. The

door to this container was open and it was not under surveillance. Mr. Repp and I inspected the contents of the container and identified Depleted Uranium which is possessed under NPI's MD-31-025-03 Radioactive Materials License. Specifically, we identified a "Picker Wheel" and a "Shield for a TEM Head". I informed NPI personnel that this was a violation of Section D. 801. titled "Security of Stored Sources of Radiation". The Depleted Uranium was not secured against unauthorized removal or access from the place of storage. Afterwards, I instructed NPI personnel to lock the Sea Land container and they did. On April 9, 1998 when I arrived at NPI for the exit interview, I found the Sea Land container unlocked. The door was open and the Depleted Uranium was not under surveillance. The door to the Sea Land container did not have a Caution-Radioactive Materials Sign on it and it was not identified as a restricted area. Section D. 802 titled, "Control of Sources of Radiation not in Storage", requires the licensee to control and maintain constant surveillance of licensed radioactive material that is in an unrestricted area. In addition, two TEM rings (which were found stored in the sea land container) contained approximately 17.0 kilograms of Depleted Uranium each and were not identified on the Depleted Uranium Inventory record.

**4. Labeling Containers VIOLATION**

On April 2 and April 9, 1998, I observed Depleted Uranium (which is possessed under NPI's MD-031-025-03 license) stored in the Sea Land Container in NPI' parking lot. The Sea Land Container, the box inside and the actual teletherapy parts which contained Depleted Uranium did not bear labels with the words, "Caution, Radioactive Material" or "Danger, Radioactive Material". At the exit interview, Messrs. Repp and Williams stated that they were certain that they are exempt from labeling requirements. I handed them a copy of the State Regulations, they reviewed it and could not identify an exemption which applied.

**5. Recordkeeping for Decommissioning VIOLATION**

The licensee's records of information important to safe and effective decommissioning of the facility were incomplete, missing, lost and/or not available for inspection. This is a repeat violation from the April 1997 Departmental Inspection. Specifically, records of spills, leaks, and other occurrences involving the spread of radioactive material in and around the facility were still not available for inspection by the Agency. The only records NPI could produce was records regarding the leaks in the canal and the main pool. Records involving the location of inaccessible radioactive contamination such as buried pipes and soil were still not available for inspection. In NPI's Response Letter date July 16, 1997, Mr. Williams stated that they were in substantial compliance with Section C.29(f) however they are still in violation. During the exit interview, Mr. Ransohoff talked at length about the volume, activity and location of approximately 2000 cubic feet of contaminated soil used as fill during construction which occurred from 1981 to 1983; however, there were no records available for inspection. In addition, NPI still cannot produce any records regarding buried contaminated drains and cobalt-60 soil concentrations of a partially remediated hole in the LAA. Current records regarding cobalt-60 soil concentration of the adjacent railroad property and other areas down grade were also not available for inspection.

**6. Procedure For Exit From The LAA ISSUE OF CONCERN**

On March 26, 1998, RHP Inspectors had completed the inspection of the LAA when Mr. Williams identified radioactive contamination on his left arm. Mr. Williams experienced



difficulty in decontaminating this area. At this time, a portal monitor technician was not available to operate the Helgeson Mini HECM Gas Proportional Booth Monitor. Mr. Williams walked passed the monitor twice while he was contaminated with cobalt-60 without "counting out". The first time, he walked passed the Booth Monitor so he could operate the Monitor's controls while Mr. Nelson was "counting out". The second time, a portal monitor technician was available however Mr. Williams again walked passed the Booth Monitor to obtain a scouring pad to remove the contamination from his shoulder. Afterwards, when Mr. Williams finally "counted out" in the Booth Monitor, he tripped the alarm which indicated that there still was contamination on his shoulder. Mr. Williams claims that this is not a violation because he never actually left the LAA without "counting out". It is the RHP's position that no person should ever physically pass the monitor prior to "counting out" and being free of cobalt-60 contamination. Upon further review, it was determined that NPI modified the procedure regarding "Exiting the LAA" on April 1, 1993 with out notification or permission from the RHP. This modified procedure allows a contaminated employee to bypass the Booth Monitor and operate it's controls as long as he remains in the LAA. Neither procedure is incorporated into the license or "tied down" by amendment. The RHP Inspection Staff considers this to be a poor health physics practice.

7. Survey Meter Calibration

**ISSUE OF CONCERN**

NPI personnel could not demonstrate National Institute of Standards and Technology (NIST) traceability of their calibrator source (Cobalt-60, M-498, 6.10 mCi) which they use to calibrate 65 of their survey meters and 46 of their self reading dosimeters. No traceability or certification records were available for inspection. NPI's procedure for calibrating survey meters requires the source to be NIST traceable; however, this procedure is not "tied down" to the license by amendment. At the exit interview, NPI still could not explain or demonstrate how they know that their calibration procedure is accurate and NIST traceable.

8. Respiratory Protection Program

**RECOMMENDATIONS**

The Inspection Team conducted a review of NPI's Respiratory Protection Program. I discussed their Respiratory Protection Program with Ms. Mardel Knight, a Certified Industrial Hygienist at MDE. Ms. Knight provided the following recommendations i presented to NPI management at the exit interview:

- a. NPI should conduct an annual review of their respiratory protection program
- b. NPI's written Respiratory Protection Program needs more detail such as quantity and types of respirators, model number of respirators, serial numbers of respirators, type of fit testing which is conducted, names of service contractors, and names of the emergency responders.
- c. A log should be kept which documents the "30 day checks" of each respirator.
- d. The SCBAs need to be checked within the 30 day frequency.
- e. Each Emergency Responder is required to pass the medical examination within a 12 month frequency and the new forms must be maintained for inspection.

Licensee Management Exit Interview

The licensee management exit interview was held on April 9, 1998 at NPI. Messrs. Nelson, Repp, Ransohoff, Williams and I attended the exit interview and we discussed the



results of the inspection. Mr. Ransohoff disagreed with all of the violations found. Messrs. Williams, Repp and Ransohoff also disagreed with the Issue of Concern regarding the Procedure For Exit From The LAA. Messrs. Repp and Ransohoff stated that the recommendations regarding their Respiratory Protection Program were reasonable and would be implemented prior to the next melting campaign when respiratory protection will be necessary. Messrs. Ransohoff and Repp also agreed with the Issue Of Concern regarding Survey Meter Calibration. Mr. Repp stated that they would demonstrate NIST traceability within one week. We also discussed other issues including training of visitors who enter the LAA, dose to members of the general public for 1997, Sediment and Stormwater Management application, MNCPPC application, ALARA and the Maryland Radiation Control Advisory Board's future tour of NPI's Dickerson plant.

During the exit interview, Mr. Ransohoff also made the following comments:

1. Mr. Ransohoff stated that Depleted Uranium does not need to be secured against unauthorized removal from place of storage because he is entitled to a general license and nobody locks up general licensed material. He also stated that he resolved this issue years ago. He went on to state that Cobalt-60 exists in cosmic dust from meteors and he recently saw one near the plant. Mr. Ransohoff stated that as a result, he was concerned about the accuracy of his environmental monitoring.
2. Mr. Ransohoff offered Mr. Nelson and I tickets to the Washington Wizards Basketball game on April 9, 1998 at the MCI Center in Washington D.C. and we declined. He asked again if we wanted to go to the game, he held an envelope up in the air and stated that he had extra tickets. Again, we declined and he tossed this envelope on the table.
3. Mr. Ransohoff asked if Mr. Nelson and I could change the soil concentration limits described in Amendment 33 to levels which would put NPI in compliance. I stated that I could not do that and showed him a copy of the Stipulation and Settlement. I pointed out paragraph 13 which describes the agreement to clean contaminated soils to Amendment 33 criteria by June 15, 1994. NPI has failed to meet this deadline because they never cleaned up the adjacent railroad property to concentrations below 8 picocuries per gram. In addition, they never notified the property owner regarding the contaminated soil.
4. Mr. Ransohoff stated that he does not have to comply with the soil concentration limits described in Amendment 33 and the June 15, 1994 deadline for clean up of contaminated soils because he has an oral agreement with Judge Pincus which supersedes the Stipulation and Settlement of January 3, 1994.
5. Furthermore, he stated that he is not required to comply with the terms and conditions of the Stipulation and Settlement because MDE dropped the law suit against NPI and he won. I disagreed and showed him paragraph 11 of the Stipulation and Settlement which describes the \$75,000 payment plan. I informed Mr. Ransohoff that he is required to comply and that is why NPI is paying \$10,000 a year in fines. Mr. Ransohoff stated repeatedly that it is not a fine. He told me never to call it a fine again. He told me that if I ever called it a fine again that he was going to shoot me. He stated again that this is not a fine. He told me that this is very serious. He leaned over towards me and again told me that if I ever called it a fine again that

he was going to shoot me. Mr. Ransohoff then said that if I ever called it a fine, he would terminate me.

At the conclusion of the exit interview, Mr. Ransohoff and I signed the Radioactive Material Inspection Findings and Licensee Acknowledgement Form (MDER E-1) which indicates that a letter will be sent to NPI describing Agency requirements and that corrective actions must be immediately initiated for the violations identified during the inspection.

#### Miscellaneous Notes:

NPI has still not obtained the permits necessary to begin construction of the courtyard enclosure. Specifically, NPI has not even applied to the Montgomery County Department for Sediment Control and Stormwater Management for a required permit. At the exit interview, Mr. Ransohoff explained that it is not his fault. He stated that he has not applied for the permit because there is a property line dispute and "county red tape". NPI plans to melt 400,000 to 500,000 curies of cobalt as soon as this application is accepted. NPI has still not obtained the permit necessary to install the fire suppression system required for the two pool irradiators.

The Inspection Team reviewed Dosimetry records for the year of 1997. One employee received over 2.0 REM (2098 mRem) and six employees received over 1.0 REM. The occupational doses for the year of 1997 were substantially lower than previous years. There was no melt or hot cell clean up in 1997. The highest extremity exposure for 1997 was 4.283 REM.

The results of the boundary monitoring program were reviewed and determined to be in compliance with the 500 mRem per year limit at all locations. Monitors have been moved inside the fence to prevent theft and tampering. The highest result was 456.9 mRem for the year at the 2019 Dry Pond location. Background was measured to be 68.2 mRem at the Lytle Storage Facility.

On March 26, 1998, Mr. Nelson and I inspected the LAA. We interviewed Messrs. Corun and Weedon. We verified the physical location of Cobalt-60 and Depleted Uranium as identified on the inventory records. Mr. Weedon demonstrated and explained procedures regarding daily checks, weekly checks, air monitoring, water monitoring and survey meter calibration.

For the year of 1997, the average release to WSSC was  $1.4 \text{ E-5 uCi/ml}$ . No monthly average exceeded  $3.0 \text{ E-5 uCi/ml}$ . The total activity which was dumped was 13.9 mCi or approximately 1.4% of the 1.0 Curie limit.

On 2/16/98, NPI shipped 100 cubic feet, 524 pounds, 36.0 mCi of dry solid radioactive waste (which was removed from the waste storage) to Barnwell, South Carolina for disposal.

The Inspection Team reviewed NPI's One Kilometer Surveys for the year of 1997. NPI personnel surveyed 54 acres and found seven cobalt-60 particles in the Dickerson community.

On March 26, 1998 Mr. Manley and Ms. Thim conducted a radiological survey of two residential properties near the plant. No radioactive particles were found.

On September 19, 1997, the NPI Health Physicist changed the HEPA filter in the Hot Cell. The HEPA filter is usually replaced every one or two years. Currently NPI has 9 used HEPA filters in storage for decay because they are too hot to ship for disposal. The dose rates at contact with these used HEPA filters range from 2.0 R/hr to 9.0 R/hr.

Inspectors reviewed the Emergency Generator Log for the year of 1997 and year to date 1998. The generator is tested each week and automatically turns on during power failures. This generator only powers the Hot Cell exhaust fan and emergency lighting in the LAA.

The Inspection Team collected soil and water samples which were analyzed by the Maryland Laboratory Administration. Results are attached.

#### Independent Physical Measurements:

A dose rate survey was conducted using a Ludlum model 14-C, SN 141948 which was calibrated on October 3, 1997 by Ludlum.

#### Measured:

5.0 mR/hr	door by shoe rack in LAA
10.0 mR/hr	main pool, 1 meter above surface
40.0 mR/hr	south canal, 1 meter above surface
10.0 mR/hr	north canal, 1 meter above surface
25.0 mR/hr	door to the HEPA filter storage room
0.5 mR/hr	at contact with the Hot Cell window
5.0 mR/hr	radiation area signs and ropes in the courtyard of the LAA

#### Attachments:

Radioactive Material Inspection Findings and Licensee Acknowledgement Form (MDER E-1)  
Radiological Survey Record of Two Dickerson Residential Properties 3/26/98  
NPI Radioactive Respiratory Protection Program 5/1/92  
Stipulation and Settlement, Montgomery County Circuit Court 1/3/94  
Stipulation, Montgomery County Circuit Court 11/12/97  
Depleted Uranium Inventory At Dickerson 3/20/98  
Cobalt-60 Inventory At Dickerson 3/13/98  
Health Physics Daily Checklist  
Health Physics Weekly Checklist  
NPI Notification Letter Regarding The Next Melting Campaign 2/25/98  
Maryland Laboratory Administration, Results of Soil and Water Analysis 4/16/98

Lead Inspector: Alan Jackson

Date of Report: April 16 1998

Reviewer: Paul E. Trump Jr.

Date of Review: 4/22/98

Program Manager

TABLE II - continued  
Neutron Products Sample Results

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>RESULT</u>
<u>Results in total microCuries</u>		
Smear-Wipe #14 1500 hrs 10/19/93	Co-60	$(1.5 \pm 0.4) \text{E-4}$
Hot Cell Particulate Filter After HEPA 10/20/93	Co-60	$<2 \text{E-4}$
Smear-Wipe Bay Door Floor 1500 hrs 10/19/93	Co-60	$(2.4 \pm 0.4) \text{E-3 (15\%)}$
Smear-Wipe Hot Cell Vent Exhaust 1500 hrs 10/19/93	Co-60	$(1.8 \pm 0.4) \text{E-3 (15\%)}$
Smear-Wipe hot Cell Vent Bypass 1500 hrs 10/19/93	Co-60	$(2 \pm 3) \text{E-4}$
Soil Spot MR-23 1200 hrs 10/21/93	Co-60	$(5.84 \pm 0.04) \text{E-1 (10\%)}$
Smear-Wipe Post HEPA 1200 hrs 10/21/93	Co-60	$<1 \text{E-3}$

TABLE II - continued  
Neutron Products Sample Results

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>RESULT</u>
<u>Results in microCuries per gram (wet weight)</u>		
Dry Pond Soil 1355 hrs 10/19/93	Co-60	$(3.04 \pm 0.02)E-4$ (15%)
Discharge #2 Soil 1415 hrs 10/19/93	Co-60	$(8.5 \pm 0.3)E-6$ (15%)
Railroad Property Soil 1500 hrs 10/19/93	Co-60	$(4.10 \pm 0.02)E-4$ (15%)
North Dry Pond Soil 1500 hrs 10/19/93	Co-60	$(6.3 \pm 1.2)E-7$ (15%)
Railroad Spur by Pipe Soil 1500 hrs 10/19/93	Co-60	$(1.271 \pm 0.012)E-4$ (15%)
Creek Soil 1500 hrs 10/19/93	Co-60	$(9.7 \pm 1.3)E-7$ (15%)
Court Yard Fence 1500 hrs 10/19/93	Co-60	$(8.03 \pm 0.11)E-5$ (15%)
Gravel from Beneath Hot Cell Exhaust on Roof 1500 hrs 10/19/93	Co-60	$(3.77 \pm 0.05)E-5$ (15%)
DC Sewage Treatment Plant - Pretreatment #3 1200 hrs 10/21/93	Cr-51 I-131 Tc-99m	$(6 \pm 3)E-7$ $(6.44 \pm 0.16)E-6$ (25%) $(9.4 \pm 0.2)E-6$ (25%)
Courtyard Debris (leaves)	Co-60	$(1.696 \pm 0.003)E-2$ (50%)

Table II (continued)Neutron Products Sample Results

<u>SAMPLE</u>	<u>ISOTOPE</u>	<u>RESULT</u>
<u>Results in microCuries per gram (wet weight)</u>		
DC Sewage Treatment	Cr-51	(9±4)E-7
Plant-Pretreatment #4	I-131	(6.24±0.15)E-6 (25%)
1200 hrs	Tc-99m	(9.3±1.5)E-6 (25%)
10/21/93		
DC Sewage Treatment	I-131	(8.9±0.2)E-6 (25%)
Plant-Post Treatment#1	Tc-99m	(9.2±0.8)E-7 (25%)
1200 hrs		
10/21/93		
DC Sewage Treatment	I-131	(8.7±0.2)E-6 (25%)
Plant-Post Treatment#2	Tc-99m	(9.2±1.0)E-7 (25%)
1200 hrs		
10/21/93		

Note: Results are reported as: result ± 1s counting uncertainty. Estimates of systematic uncertainty are reported in parentheses, if appropriate

**Maryland Department of the Environment  
Radiological Health Department**

**Neutron Products, Inc.  
MD-31-025-01 Inspection  
Photographs taken on September 20, 2000**

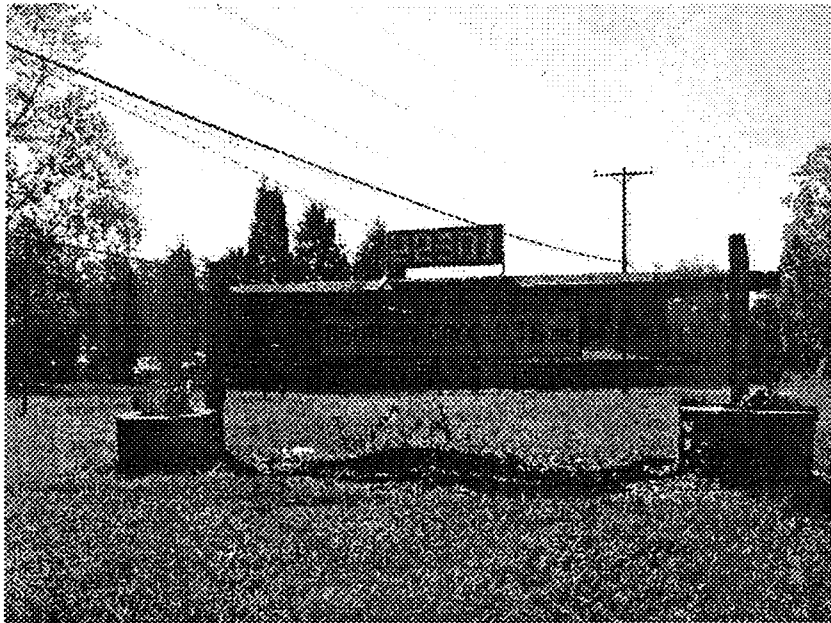
Picture#1 – The courtyard area. Waste is stored in the waste storage rooms (back left) and with in the B-25 shipping containers.



Picture#2 – Another view of the courtyard, from the unrestricted side of the fence. Two soil samples were taken in this area: by the fence near the drain and by the corner near the generator.



Picture#3 – Neutron Products, Inc. sign.



Picture#4 – Mr. Fisk's house which is directly across the street from NPI. NPI has posted a monitoring badge on his porch as well as in his home. The badge outside received 105.4 mRem for 1999 and the badge inside his home received 66.2 mRem for 1999.

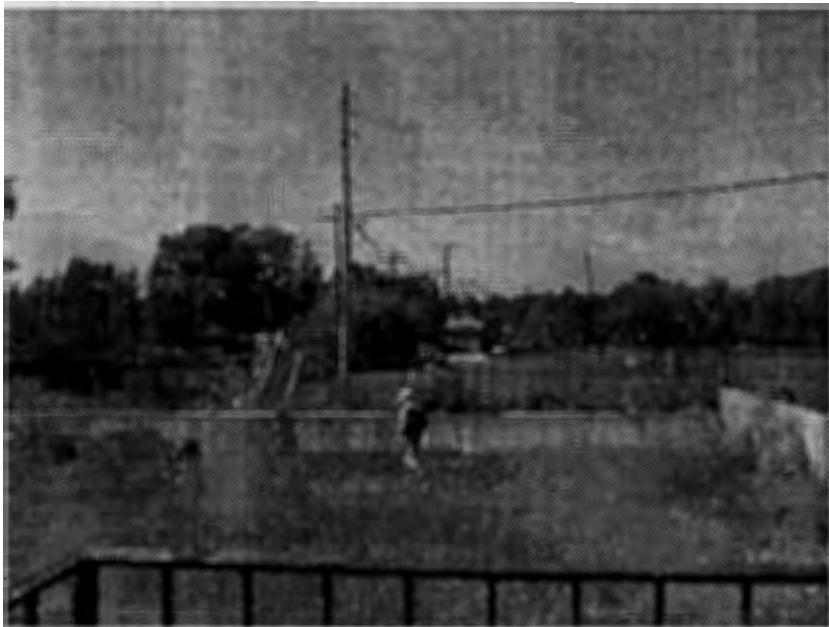




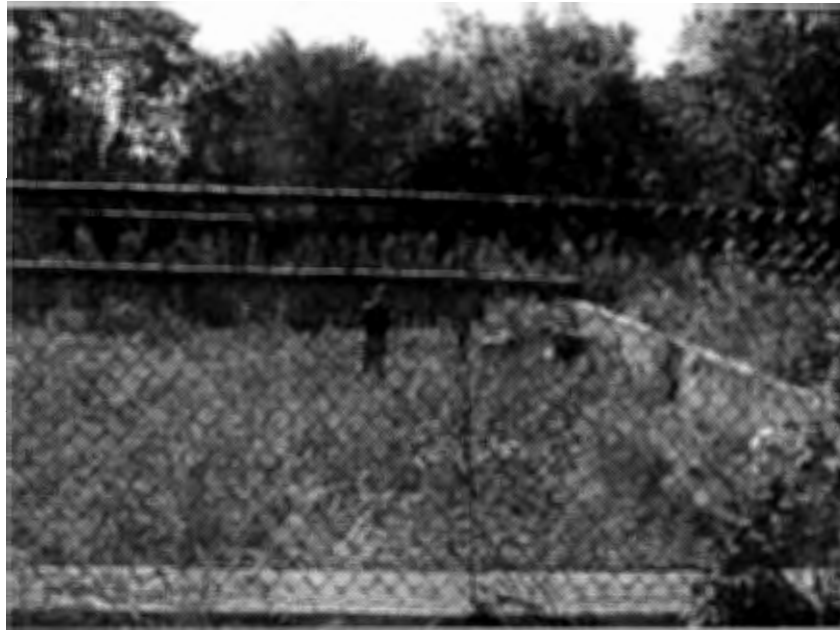
Picture#5 – The stone trap.



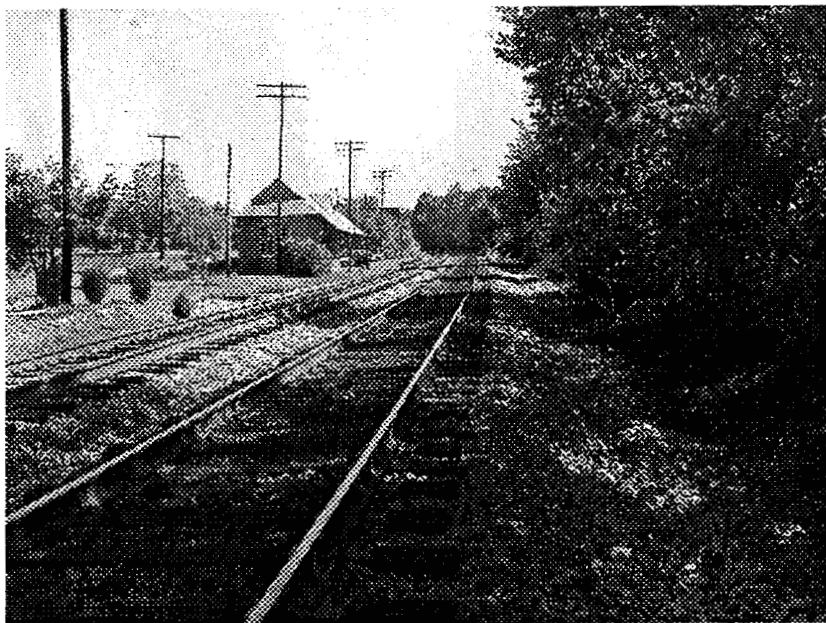
Picture#6 – The dry pond area (looking out from NPI building).



Picture#7 and #8 – Collecting soil samples from the rock bed within the dry pond area.



Picture#9 – View of the railroad, looking toward Neutron Products, Inc.



Picture#10 and 11– Old drainpipe that extends under and next to the railroad.



MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
RADIATION LABORATORY REPORT  
(410) 767-5537

SAMPLE SOURCE: NPI INC. COLLECTOR: A. JACOBSON SAMPLE TYPE: SOIL  
COLLECTION DATE: 4/30/97 RECEIPT DATE: 5/2/97 REPORT DATE: 5/22/97 ANALYSES BY: S. WISE

*S. Wise*

Activity (pCi/gram)

<u>LAB. NO.</u>	<u>Co-60</u>	<u>COMMENT</u>
1852	23 ± 6	Railroad property by. train station
1853	8.6 ± 0.6	Railroad property - break in pipe
1854	< 0.07	Creek Bed 30 feet from pipe
1855	0.18 ± 0.06	Creek Bed 40 feet from pipe
1856	56 ± 2	Dry Pond - culvert
1857	19 ± 2	Dry Pond
1858	1800 ± 100	Courtyard leaf/soil (wet)

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
RADIATION LABORATORY REPORT  
410-767-5537

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SAMPLE SOURCE: NPI INC. COLLECTOR: A. JACOBSON SAMPLE TYPE: WIPE  
COLLECTION DATE: 4/30/97 RECEIPT DATE: 5/2/97 REPORT DATE: 5/9/97 ANALYSES BY: S. WISE

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Activity ( x 10E-06  $\mu$ Ci/wipe )

<u>B. NO.</u>	<u>WIPE NO.</u>	<u>GROSS ALPHA</u>	<u>GROSS BETA</u>	<u>Co-60</u>	<u>COMMENT</u>
47	1	1 $\pm$ 1	2 $\pm$ 1	< 5	DESK TOP
48	2	< 1	< 2	< 5	MANIPULATOR (RIGHT)
49	3	< 1	25 $\pm$ 3	35 $\pm$ 6	STAIRS
50	4	< 1	39 $\pm$ 4	78 $\pm$ 11	STEP TO LOCKER ROOM
51	5	< 1	20 $\pm$ 3	35 $\pm$ 10	COUNTER TOP

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE  
RADIATION LABORATORY REPORT  
410-767-5537

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SAMPLE SOURCE: NPI INC. COLLECTOR: A. JACOBSON SAMPLE TYPE: WATER  
COLLECTION DATE: 4/30/97 RECEIPT DATE: 5/2/97 REPORT DATE: 5/9/97 ANALYSES BY: S. WISE

Activity (  $\mu\text{Ci/liter}$  )

<u>LAB. NO.</u>	<u>CONTAINER NO.</u>	<u>Co-60</u>
1859	NC 1	$1.24 \pm 0.04 \times 10\text{E-}01$
1860	MP	$6.3 \pm 0.1 \times 10\text{E-}01$



DEPARTMENT OF THE ENVIRONMENT  
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Supplementary Sheet

License No. MD-31-025-01

Amendment No. 45

Neutron Products Inc.  
22301 Mount Etna Road  
P.O. Box 65  
Dickerson, Maryland 20842

In accordance with Maryland Department of the Environment (MDE) letters dated January 31, 1997, "Proposed Revised Approval for Neutron Products, Inc. (NPI) Courtyard Enclosure", and February 12, 1997, "Revised Agency Approval for Courtyard Enclosure" and Neutron Products, Inc. (NPI) letter dated February 7, 1997, Condition 13 of Radioactive Material License Number MD-31-025-01 is amended as follows:

Condition 13:

Until NPI complies with Paragraphs 3.8 and 5 of the Stipulation and Settlement Agreement, including but not limited to having an approved plan for off-site shipment of radioactive material waste and decommissioning, NPI's possession limit for dry storage of radioactive material waste is limited to 800 Curies.

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FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date February 13, 1997

RADIOLOGICAL HEALTH PROGRAM MANAGER II

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DEPARTMENT OF THE ENVIRONMENT  
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License No: MD-31-025-01

Amendment No.: 44 CODE 02305

Neutron Products Inc.  
22301 Mount Ephraim Road  
P.O. Box 68  
Dickerson, Maryland 20842-0068

In accordance with letters and attachments dated June 30, 1999, March 15, 2000, April 11, 2000 and June 7, 2000  
Radioactive Material License Number MD-31-025-01 is amended as follows:

Condition 21A to read:

The compaction of radioactive waste prior to storage or disposal is approved by the Department in accordance with NPI procedure titled, "Radwaste Compaction Start-up Protocol", Revision 0, dated June 7, 2000. RHP approval for NPI's use of this commercial compactor is contingent on the following:

1. All compaction of radioactive material waste generated at NPI prior to August 24, 1999 shall be labeled as old radioactive waste. This radioactive waste shall be disposed of by NPI prior to August 24, 2004.
2. All other compacted radioactive waste shall be disposed of in accordance to License Condition 21B and specific to those dates that waste was initially generated.
3. Each container of compacted radioactive waste must bear a durable, clearly visible label identifying:
  - (i) The container identification number;
  - (ii) The date the radioactive waste was generated; and
  - (iii) The date of compaction.
4. If a compacted container includes radioactive waste generated after August 24, 1999 and has different dates of waste generation, NPI will use the oldest date of generation to establish a shipping date.
5. NPI shall not mix in a container compacted radioactive waste generated prior to August 24, 1999 with compacted radioactive waste generated after August 24, 1999.





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License No: MD-31-025-01

Amendment No.: 44 CODE: 02305

Neutron Products Inc.  
22301 Mount Ephraim Road  
P.O. Box 68  
Dickerson, Maryland 20842-0068

Condition 37 to add letters with attachments dated June 30, 1999, March 15, 2000, April 11, 2000 and June 7, 2000 regarding NPI's use of the S&G Enterprises, Inc., Model 55AR-HY RAM FLAT Compactor.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Roland G. Fletcher  
Radiological Health Program Manager

June 13, 2000

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REM 6/13/2000

CET 6/15/2000



DEPARTMENT OF THE ENVIRONMENT  
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Supplementary Sheet

License No. MD-31-025-01

Amendment No. ~~43~~ 44

Neutron Products Inc.  
22301 Mount Ephriam Road  
P.O. Box 68  
Dickerson, Maryland 20842

In accordance with letter dated July 10, 1996, Radioactive Material License Number MD-31-025-01 is amended as follows:

Condition 13 to add letter dated July 10, 1996 authorizing the exchange frequency of monitoring dosimeters to quarterly.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date July 16, 1996

*Roland H. Fletcher*  
RADIOLOGICAL HEALTH PROGRAM MANAGER II

SAO

CET

DER-L1 (supp) (11/90)

7/16/96



DEPARTMENT OF THE ENVIRONMENT  
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**RADIOACTIVE MATERIAL LICENSE**

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Pursuant to the Maryland Radiation Act, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Maryland State Department of the Environment, now or hereinafter in effect and to any conditions specified below. In accordance with application dated August 01, 1994 with attachments and Departmental revisions, Radioactive materials license MD-31-025-01 is renewed its entirety.

<b>LICENSEE</b>		3. License No.
1. Name <b>Neutron Products, Inc.</b> 22301 Mt. Ephraim Road P.O. Box 68		<b>MD-31-025-01</b>
2. Address <b>Dickerson, Maryland 20842-0068</b>		4. Amendment No. <b>43</b>
		5. Expiration Date <b>January 31, 2001</b>
6. Radioactive material (element and mass number) A. Cobalt-60 with small quantities of activation products from impurities in encapsulation materials.  B. Cobalt-60.  C. Cesium-137.	7. Chemical and/or physical form A. <sup>1</sup> Sealed sources, singly or doubly encapsulated.  <sup>2</sup> Stellite bearings and axle rods mounted in stainless steel corners sheared from the top end of BWR control rod assemblies.  B. Sealed Sources.  C. Sealed sources (3M models 6D6C).	8. Maximum amount of radioactivity which licensee may possess at any one time A. 2,000,000 curies.  B. No source to exceed 10 curies; total 30 sources.  C. 6 sources total; No source to exceed 14 millicuries.
9. Authorized Use		



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Amendment No. 43

- |   |   |   |
|---|---|---|
| 6. Radioactive material element & mass number:  | 7. Chemical and/or physical form:                       | 8. Maximum amount of radioactivity which licensee may possess at any one time:      |
| D. Cesium-137.  | D. Sealed source (U.S. Nuclear irradiator model GR 8A). | D. 475 curies.  |
| E. Any radioactive material of atomic numbers 3 to 92 as activation products.         | E. Encapsulated thermal and flux monitors.              | E. No more than 10 millicuries each radionuclide; total possession 100 millicuries. |
| F. Any radioactive material of atomic number 3 to 92 except special nuclear material. | F. Sealed sources.                                      | F. No source to exceed one millicurie; total possession 10 millicuries.             |
| G. Cobalt-60.   | G. Sealed source in AECL Gamma Cell 220.                | G. 2,000 curies.  |

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

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License No. MD-31-025-01

Amendment No. 43

9. Authorized use:

- A. Manufacture of special form cobalt-60 sealed sources. Sealed source fabrication and manufacturing operations shall be conducted only in the hot cell. Operations involving bare cobalt-60 shall be performed in the hot cell. Sources distributed shall meet the current American National Standards Institute (ANSI) standard. The receipt of unencapsulated cobalt-60 is not permitted.

The source fabrication process permits the removal of an encapsulation to create a newly encapsulated source and the encapsulation of cobalt-60 as waste.

Removal of encapsulation and melting of unsealed cobalt-60 to fabricate solid slugs containing up to 12,000 curies per slug.

Radioactive sources distributed by NPI shall be doubly encapsulated according to specification authorized by the registry of radioactive source and device sheet numbers MD-474S108S and MD-474S109S.

Research and development irradiation in the main pool, canals, and hot cell of material other than explosives, food, or materials whose degree of flammability hazard exceeds specification 0,1, or 2 of the National Fire Protection Association's Fire Protection Guide on Hazardous Materials (latest published edition).

Radioactive material authorized in Item 7.a(2) is for possession and storage only. No additional receipt of stellite is authorized.

- B. For use in attenuation studies and as calibration sources.

- C. Instrument calibration.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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License No. <u>MD-31-025-01</u>	Amendment No. <u>43</u>
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- D. Possession and storage only until disposed of as waste.
- E. For removal of components from surveillance capsules and distribution to authorized licensees in accordance with letters dated August 2, 1977, October 12, 1977, and October 18, 1977.
- F. Calibration sources.
- G. Possession and storage only.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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CONDITIONS

10. The authorized place of use is the licensee's address stated in Item 2. The licensee must notify the Radiological Health Program 30 days prior to vacating a permanent use address as is required by Section D.1301 of COMAR 26.12.01.01.
11. A. The radiation protection program shall be under the supervision of Jeffrey D. Williams.  
B. Radioactive material shall be used by, or under the supervision of Jeffrey D. Williams, Jeffrey W. Corun, Donald S. Franklin, James R. Demory, Jackson A. Ranschoff, Dale L. Repp, and/or Marvin Turkanis.
12. A. Upon receipt or transfer of sealed sources in items 6, 7, and 8 line A, the licensee shall perform leak testing in accordance with NPI procedures Q-3 and current ANSI Standards. In lieu of conducting six (6) month leak tests on the above sources, the licensee may use radioactive water concentration to evaluate the radioactive material leakage from sealed sources while stored in the main pool or canals. Samples shall be analyzed daily. If the radioactive material water concentration in the pool exceeds  $5 \times 10^{-4}$  microcuries per milliliter, then the licensee's documented evaluation should include the following:
  - (1.) An evaluation to determine if the increased pool water concentration is the result of leakage from sealed sources stored in the pool.
  - (2.) If leakage of sources is determined, describe the extent and methodology of remediation necessary.
  - (3.) The methodology used to return pool parameters to those levels specified in license condition 27 C.1.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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**CONDITIONS CONTINUED**

- B. Each sealed source as defined in items 6, 7, and 8, line B, C, D, & F, containing radioactive material, shall be tested for leakage and/or contamination at intervals not to exceed six (6) months. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the source transfer, the sealed source shall not be used until tested. If the test reveals the presence of 0.005 microcuries or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or disposed of in accordance with Departmental regulations. A report shall be filed within five days with the Maryland Department of the Environment, Radiological Health Program, 2500 Broening Highway, Baltimore, Maryland 21224, describing the equipment involved, the test results, and the corrective action(s) taken.
- C. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of a device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate.
- D. Records of leak tests shall be kept in units of microcuries and maintained for inspection by the Department in the records room.
- E. If the test of singly encapsulated cobalt-60 sources reveals the presence of 0.05 microcuries or more of the removable contamination, the licensee shall immediately withdraw the sealed source from use or storage and shall cause it to be decontaminated and repaired. Records of such leak tests shall be maintained for inspection by the Department in the records room.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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- F. If the test of doubly encapsulated cobalt-60 or any other doubly encapsulated radioisotopic sources reveals the presence of 0.005 microcuries or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired. Records of such leak tests shall be maintained for inspection by the Department in the records room.
- G. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically authorized by the Department, the U.S. Nuclear Regulatory Commission or another Agreement State to perform such services.
13. Ownership, possession, or control of radioactive materials authorized in Item 7.A.(2) including incidental activation products, shall not be transferred to other persons, (as "person" is defined in COMAR 26.12.01.01.) except to a licensed burial site.
14. A. Neutron Products, Inc. may receive cobalt-60:
- (1.) From a vendor who has produced cobalt-60 in a reactor (after approval of the specifications by the Department); or
  - (2.) From a teletherapy unit when Neutron Products, Inc. installs a replacement source.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date

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**CONDITIONS CONTINUED**

B. Neutron Products, Inc. may not receive cobalt-60:

- (1.) That is contaminated with other isotopes; other than activation products normally present in activated materials e.g., (manganese-54) and received from a reactor.
- (2.) As any material contaminated with cobalt-60; or
- (3.) As a sealed source which is not received in exchange for a replacement source unless prior approval has been granted by the Radiological Health Program. Such prior approval may be granted only after a thorough review of a specific proposal that describes the source of cobalt, the total activity and quantity involved, other isotopes involved, the proposed use and the potential market of any product thus produced and the plan for disposal of any waste generated.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



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CONDITIONS CONTINUED

5. A. A gas proportional portal monitor equivalent to the Helguson HECM-2 capable of detecting 2500 dpm at one inch and 5000 dpm at three inches shall be utilized in a location approved by the Department. The monitor shall be used by all personnel who exit the Limited Access Area ("LAA"). They shall remain standing in the sensitive detection zone of the monitor for at least two full minutes. Each person shall expose his/her back, front, right and left sides to the detectors for thirty seconds each. The monitor shall be maintained and used in accordance with the manufacturer's specifications at all times. At a minimum, this monitor shall be inspected by the manufacturer in accordance with the terms of the Agency approved, service contract dated September 15, 1989, Agreement #SA/89/1. The monitor shall be maintained and used in such a manner as to ensure its ability to accurately detect levels of radioactivity of 2500 dpm on the hands and 5000 dpm on the whole body. The monitor must be fully operational and kept free from contamination at all times unless unforeseeable and unavoidable operational problems arise. The Department must be notified by telephone within one workday in the event that the portal monitor is not operational. The contingency plan describing personnel monitoring procedures for use during downtime shall be conducted as submitted in referenced letter of May 26, 1989. The portal monitor must be located in the access and egress area as identified in Attachment 7 to plans submitted by the licensee on April 21, 1989.
- B. Background radiation levels at the portal monitor shall not exceed 50 micro/R per hour unless otherwise authorized by the Department.
- C. The Radiation Safety Officer shall perform monthly evaluations of the portal monitoring area, the use of the portal monitor by employees, its functioning and the radiation safety training of employees, and submit monthly reports to the Department based upon such evaluations. These reports shall include the review of incidents of radioactive contamination above 22,000 dpm detected on personnel.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



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**CONDITIONS CONTINUED**

16. A health physics consultant shall be retained by the licensee. This consultant shall be retained subject to the approval of the Department concerning qualifications. The licensee shall be deemed responsible for any failure of the consultant to submit reports or perform required evaluations and analyses. The health physics consultant shall perform, but not be limited to, the following functions:
- A. Submit monthly evaluations to the Department regarding the health physics/radiation safety status of the facility as it relates to on going and future operations under this license. Monthly reports by the licensee's consultant shall be submitted to the Department by the last day of the next calendar month. Such evaluations shall be in accordance with NPI letter dated January 13, 1995 and RHP letter dated February 9, 1995.
  - B. Ensure that the portal monitor is properly installed and maintained;
  - C. Oversee the maintenance of the portal monitor area as required in order to assure that background radiation levels do not exceed 50 micro/R per hour;
  - D. Oversee and evaluate the RSO report in Item 14.C and submit this evaluation to the Agency as part of Item 15.A.

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date \_\_\_\_\_

RADIOLOGICAL HEALTH PROGRAM MANAGER II



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Amendment No. 43

**CONDITIONS CONTINUED**

17. A full-time trained health physics technician or full-time equivalent health physics technicians shall be retained subject to the approval of the Department concerning their qualifications. The licensee shall maintain a log which documents the work of the health physics technician. The health physics technician shall perform the following functions:
- A. During working hours the technician shall ensure the proper use of the portal monitor, hand-held frisker and any other devices employed to detect levels of radioactivity present on persons or items which exit the LAA;
  - B. Ensure that all persons log in and out upon entering and exiting the LAA;
  - C. Ensure the proper use of hand-held friskers by all persons who incur levels of contamination detected by the portal monitor;
  - D. Report immediately to the Radiation Safety Officer any contamination levels above 10,000 dpm which are detected by the portal monitor, or if the portal monitor is inoperative, under contingency monitoring procedure date [put date in license]. In the event that contamination is detected above 22,000 dpm such incidents must be evaluated by the RSO and must be reported to the Department in monthly reports submitted to the Department by the health physics consultant. Evaluations of such incidents of contamination detected shall include the name of the person contaminated and the activity of contamination detected. The Department shall be notified within two hours concerning all contaminations above 50,000 dpm which are detected by the portal monitor, or if inoperative, under contingency monitoring. During non-work hours, call (410) 243-8700 and ask the operator for "Radiation Assistance."

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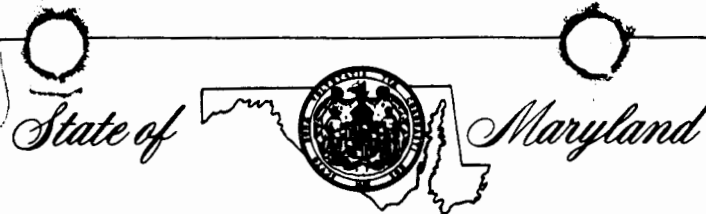
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- E. Document, for evaluation by the RSO all sources of radioactive contamination of employees in excess of 22,000 dpm.
  - F. Conduct radiation surveys within the entire facility in accordance with documented procedures set forth elsewhere in this license.
  - G. Conduct water sampling of the main source pool, canals and waste water generated in the LAA in accordance with NPI's documented procedures set forth elsewhere in this license.
  - H. Conduct radiation surveys of soil and water contamination levels in accordance with NPI's plan titled, "Environmental Surveillance Plan", Procedure R1004, July 6, 1989, for the surveillance of radioactive contamination in surface and ground water at the plant's boundary and within a one kilometer radius of the licensee's facility. This plan shall include but not be limited to a decontamination plan, a schedule for remedial action and contingencies for obtaining access to private dwellings and commercial property.
  - I. Conduct radiation surveys of all personnel, vehicles, equipment, and personal belongings exiting the gate of the courtyard area in accordance with the limits specified in Condition 13A of this license, NPI Procedure R 1011, and U.S. Department of Transportation Regulations.
18. Following any detection of contamination by the portal monitor, hand-held friskers capable of measuring levels of radioactivity as low as 500 dpm shall be used to detect the precise areas of contamination. Upon discovery of a level of contamination at or above 500 dpm, contaminated individuals must be promptly decontaminated to a level as low as reasonably achievable and remonitored.

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19. A. NPI shall maintain an established "clean room " which shall be operated and maintained so that radioactive contamination shall be limited to less than 500 dpm per 100 cm<sup>2</sup> smearable, removable contamination on any surface area. The clean room shall be located immediately inside the entrance door to the LAA and shall provide storage space for all street clothing and equipment which shall not be worn or transported into other areas of the LAA.
- B. Any clothing worn outside the LAA shall not be worn in the LAA except in the clean room. Conversely, any clothing worn in other areas of the LAA shall not be worn outside the area. Such clothing may be worn in the clean room if a thorough frisking of a person detects no contamination in excess of 2500 dpm on the hands and 5000 dpm on the whole body.
- C. An NPI random inspection plan shall be conducted in accordance with NPI's "Random Inspection Program" revision dated May 14, 1993.
1. Each documented monthly inspection shall be completed by the second week of the next month.
  2. Quarterly inspections shall be documented and available for RHP inspector review within six (6) weeks of the end of each calendar quarter.
- D. All tools, containers, materials, equipment and facilities in the restricted area shall be maintained in a clean, orderly manner and properly identified to prevent unnecessary risk of personnel contamination or injury. Radioactive contaminated material(s) not properly maintained shall be declared waste and properly disposed of accordingly.

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20. The licensee shall maintain and implement a detailed Radiation Safety Training Program as approved by the Department. At a minimum, this Program shall provide, on a quarterly basis, training sessions provided by the Health Physics Consultant to all employees who, under any circumstances, may have access to the LAA. Attendance at such training sessions shall be mandatory and documented.
21. A. The compaction of radioactive waste prior to storage or disposal is prohibited unless the Department approves of a plan submitted by the licensee for conducting this activity in a safe manner.
- B. Within 90 days from the issuance of this license, NPI shall submit to the Department for approval a comprehensive plan for disposal of all low level radioactive wastes in accordance with the following:
- (1.) Any radioactive waste storage, either temporary or long term shall only be located in the LAA with the only exception being the underground waste water storage tank. Waste storage not in the main pool/canals shall not exceed a period of two (2) years. Waste storage in the main pool/canals shall not exceed four (4) years from date of placement in the pool.
  - (2.) Radioactive waste inventory not in the main pool/canals shall not exceed 600 curies and not more than 200 cubic feet at any one time. Radioactive waste inventory and any waste like materials at NPI located in the main pool/canals shall not exceed 5000 curies.
  - (3.) All radioactive waste must be identified and dated as to when generated and containerized.
  - (4.) All radioactive waste shipments shall be composed of the oldest waste first.

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- (5.) Copies of radioactive waste shipment records shall be provided to RHP and Hazardous and Solid Waste Management Administration within 14 days of shipment dates.
- (6.) Procedures for radioactive waste handling, packaging and transportation must include personnel and equipment that will be used.

Failure to meet this schedule may result in the possession and storage of radioactive materials until actual shipment schedules are met.

22. A. Environmental thermoluminescent dosimeters (TLDs) shall be placed at the facility's boundaries. Such dosimeters shall be affixed to existing boundary structures (i.e., wall or fence) and shall be replaced on a monthly basis. Dosimeters shall be placed a maximum of one hundred feet apart along each boundary structure. The boundary radiation exposure limit shall not exceed 500 millirem per year at any point.
- B. Evaluation and remediation of unrestricted areas, drypond and ground areas surrounding the facility shall be conducted in accordance with NPI procedure "R 1004" titled "Neutron Products, Inc. - Environmental Surveillance Plan" dated July 6, 1989. The criteria for acceptability of cobalt-60 contamination of ground areas are:
- (1.) The gamma exposure at one (1) meter above the ground surface shall not exceed 10 microR/hr above background for an area greater than 900 sq. ft. and shall not exceed 20 microR/hr above background for any discrete area (i.e. less than 900 sq. ft.).

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(2.) The concentration limit for cobalt-60 soil contamination is 8 picocuries per gram above background for an area. All soil exhibiting levels of radioactivity in excess of the above, wherever found, shall be removed and properly stored/disposed of as radioactive waste by the licensee. The Department shall be furnished with documentation of the discovery, survey dates and disposition of such radioactive material found off-site on a monthly basis.

C. A floor radiation monitor of a type approved by the Department shall be used on a weekly basis to detect surface levels of radioactive contamination on all surfaces within the facility outside of the LAA. The licensee shall maintain records regarding the use of this monitor, the contamination found and any decontamination performed.

23. Licensee shall, with employee permission, conduct or cause to be conducted employee home and vehicle surveys on an annual frequency, utilizing NPI procedure "Guideline for NPI Home Contamination Survey" R-8010 dated June 29, 1988.
24. NPI shall establish a records room in an unrestricted area within 90 days from the issuance of this license. The records in this room shall be inclusive of but not limited to legible copies of all health physics records, copies of bound logs, IRC and Radiation Safety meeting, radioactive waste inventories, surveys, environmental surveillance records, pool/canal conditions, radioactive material inventories, plant and personnel radiation incidents, calibrations performed, source melts conducted, personnel monitoring, NPI policies, procedures and drawings, and employee training and exposure records.

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25. NPI shall perform and document a radioactive material inventory within 90 days of the issuance of this license. Thereafter these inventories shall be performed on a six month basis (January and July each year) for review by the Department.
26. NPI shall develop and issue within 90 days of the issuance of this license for Agency approval a procedure specific to the clean-up of the cell following a cobalt-60 melt. The procedure shall include at least the following:
- A. Pre-entry cell dose-rate assessments.
  - B. Hot cell personnel entry requirements.
  - C. LAA health physics requirements.
  - D. Methods of radioactive waste handling and removal.
  - E. Management oversight.
  - F. Record keeping requirements.
  - G. Written post melt assessment.
27. A. Components used below water level in the main pool and canals which would compromise the integrity of the radiation shield during procedures such as maintenance, servicing or source addition or removal should be material with a specific gravity of 1.000 or more. All tools, vacuum tubing, or equipment which may reduce the shielding provided by the water, shall be monitored for direct radiation during introduction to the main pool or canals.

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All items removed from the storage pool and canals as well as the area above the pool and canals shall be monitored during the source handling or pool operations.

B. The main pool and canals shall be cleaned on an annual basis beginning on or before 90 days following the issuance of this license in order to remove all foreign material which accumulates on the bottom and sides of the pool. Any vacuum system used for this purpose shall be equipped with an in-line filter(s). The licensee shall develop procedures and equipment prior to performing this operation. These procedures shall be submitted for approval by RHP 90 days following the issuance of this license.

C. Pool Operating Parameters:

1. Main pool/canal water activity must not exceed  $5 \times 10^{-4}$  uCi/cc.
2. Main pool/canal water conductivity must not exceed 10 micro siemens-cm.
3. Main pool/canal water must be within a pH range of 6 to 8.
4. Main pool/canal water temperature must <sup>not</sup> exceed 95 F.

When pool/canal water exceed these values for a period greater than 72 hours, all operations must cease until water quality is restored and maintained at these levels.

28. A. All LAA facility equipment, controls, piping and filters etc. dealing with RAM, shall be clearly labelled as to its purpose or function.
- B. The licensee shall maintain a log for review by the Department, of facility maintenance

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that has been performed. This log shall include repairs, replacement of safety equipment or building, plumbing and electrical equipment under areas affected by this license.

29. NPI shall notify RHP in writing a minimum of 30 calendar days prior to any melt operation.
30. NPI shall provide a written plan, within 90 days of the issuance of this license, describing the company's capability for fire fighting and prevention.
31. NPI shall afford to this Agency at all reasonable times opportunity to inspect materials, machines, activities, facilities, premises and records pursuant to the regulations of Section J 14(a) of Part J.
32. NPI shall conduct Radiation Safety Committee Meetings as often as necessary but not less than once per calendar quarter. These meetings shall be attended by at least the Radiation Safety Officer, Health Physicist Consultant, and Waste Management Coordinator.
33. The licensee shall install audible alarms both for high and low level water conditions to prevent overflow of pool/canals and/or lack of water shielding for sources. These alarms shall be incorporated into the off-site emergency notification system. Alarms shall be tested and documented for operation at least once each calendar quarter.
34. The number of existing radiation area monitors shall not be reduced without RHP approval and all such equipment shall have spares and operable backup instruments on hand to immediately replace any monitors.
35. NPI employees shall be monitored via a whole body counter at least once annually for those individuals performing tasks in the Limited Access Area. Additionally, individuals

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found with internal contamination following an incident of inhalation or ingestion of radioactive material shall have additional whole body counting performed within a time period necessary to determine the activity and personnel exposure.

36. Financial assurance and record keeping for decommissioning of the licensee's facility shall be conducted in accordance with Section C.29 of these regulations.
37. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material authorized by this license in accordance with statements, representations, and procedures contained in application dated August 1, 1994 and the documents as submitted by the licensee and approved by the RHP for safe operation of the facility. As currently constructed, the facility and equipment utilizing radioactive material under this license are considered a part of this license and any changes must have prior approval by RHP. Additionally, all changes in procedures, forms and checklists used under this license shall be submitted to RHP for approval and are also a part of this license. COMAR 26. 12. 01.01. "Regulations for Control of Ionizing Radiation" shall govern the licensee's statements in applications, letters or procedures unless these requirements are more restrictive than the regulations. The following documents are hereby incorporated as binding/mandatory parts of this license:

NEUTRON PRODUCTS, INC.  
REFERENCES

- A. 1. NPI Sealed Source and Device evaluation of NPI radiation processing sources (February and March) 1984, and references contained therein MD 474S108S-2/29/84, per ANSI Standard N542, NPI drawing and test results.
2. NPI Fabrication and Installation and Testing of Main Storage and Canal Transfer Tanks Spec. E-4, 8/21/74 with drawings.

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3. NPI Fabrication of Canal Tank Sections - Spec. E-2, Rev. 0-1/25, 1974 Assembly of Canal Tank - E-3, 1/74.
4. NPI SS&D Registry MD 474S1095 Teletherapy Sources - NPII Series  
NPI SS&D Registry MD 474S108S Radiation Processing Sources.
5. NPI Specification Q-1, 6/93 "Q.C. and Procedures for Welded Covers of Stainless Steel Encapsulated Cobalt-60 Sources" with attachment.
6. NPI Specification Q-2, 2/73 "Procedure for Measuring Radiation Output from Cobalt-60 Sources".
7. NPI Specification M-1, 6/93 "Specification for Stainless Steel Testing for Encapsulation of Radioactive Sources."
8. NPI Specification P-1, 6/93 "Specifications, Procedures, and Quality Control for Sealed Cobalt-60 Sources."
9. NPI Specification P-4, 1/71 "Procedure For Encapsulation of Teletherapy Sources."
10. NPI Drawings:
  - 200200 - 3/19/81 - 9/16" x 18" source
  - 200190 - 7/08/77 - 9/16" x 14" source
  - 200173(A) - 12/15/75 teletherapy source
  - 200057 - 1/10/71 teletherapy source
11. NPI Document 1/22/86 - Quality Assurance Program for Transport.
12. NPI Document 12/4/85 - Quality Assurance Program for Transportation.

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13. NPI letter 7/30/85 - Leaking Picker Sources - repair.
14. Letter 1/27/89 from Frederick Memorial Hospital for facility care of NPI employees.
15. NPI letter dated 11/7/90, additional Hot Cell Work procedures.
16. NPI letter dated 1/22& 29/91 with Drwg. No. 120055 Rev. D - "Decon area" doors.
17. NPI letters dated 9/25/90 and 12/20/90 - Hot Cell interlock and detector.
18. ANSI Standard N449 - 1974

B. Neutron Products, Inc. (NPI) Procedures

	<u>TITLE</u>	<u>Revision</u>
1.	R1001 "Counting Procedures"(March 14, 1977)	2
2.	R1002 "Sampling Procedures"(June 7, 1989)	5
3.	R1003 "Procedure for Entrance to and Exit from Contamination Control Areas"(June 6, 1989)	1
4.	R1004 "NPI - Environmental Surveillance Plan"(July 6, 1989)	0
5.	R1006 "Procedure for Disposal of Liquid Waste"(March 1, 1977)	3

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| 6.  | R1007  | "NPI - Radiation Detection Instruments Calibration Procedure"(April 25, 1991)  | 5 |
| 7.  | R1010  | "NPI - Procedure for Reporting of Radiation and Contamination Levels"(May 4, 1982)   | 0 |
| 8.  | R1011  | "Procedure for the Limits for Decontamination and Release of People and Personal Effects from Limited Access Area"(January 31, 1991) | 1 |
| 9.  | R1012  | "Procedure for Daily Operational Checkout for Routine Maintenance of the Helguson Mini HECM Booth Monitor"(October 19, 1989)         | 2 |
| 10. | NR1013 | "Procedure For Changing Spent Pool Resin"(April 28, 1993)  | 1 |
| 11. | NR2001 | "Procedure for Loading and Removal of Radioactive Shipping Containers from the Main Storage Pool"(February 11, 1977)                 | 1 |
| 12. | NR2002 | "Procedure for Dry Transfer of Sources from Pool to Hot Cell"(February 11, 1977)   | 1 |
| 13. | R2003  | "General Procedures for In-Pool Source Operations"(March 1, 1977)  | 2 |

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| 14. | R2004  | "Procedure for In-Pool Irradiations"<br>(November 26, 1973)  | 0 |
| 15. | NR2005 | "Procedure for Decanning Cobalt-60<br>Sources from Zircaloy Tubes"(February 23, 1977)                            | 0 |
| 16. | R2006  | "Leak Testing in the Pool"(February 17, 1977)  | 1 |
| 17. | R2007  | "Calibration of Effective Activity<br>by Area Method"(January 19, 1979)  | 2 |
| 18. | NR2008 | "Procedure for Placing and Unloading<br>Casks in Main Storage Pool"(no date)                                     | 1 |
| 19. | NR2010 | "Procedure for Loading and Unloading<br>NPI Large Radioactive Shipping Containers"<br>(January 13, 1983)         | 1 |
| 20. | R2014  | "Unloading and Loading of NPI-20WC-6<br>Teletherapy Shipping Package at the<br>Dickerson Hot Cell"(June 7, 1985) | 0 |
| 21. | R2015  | "Transportation of NPI-20WC-6 Teletherapy<br>Shipping Package In NPI Vehicle Or<br>Exclusive Use"(May 24, 1985)  | 0 |
| 22. | R2016  | "Preparation for Shipment of the Model<br>500 Shipping Package, Dryloading"(April 26, 1994)                      | 0 |

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23.	NR2025	"Transportation of NPI-WR-1 Shipping Containers" (October 1, 1985)	0
24.	NR2027	"Special Procedure Unloading Cobalt-60 Shipment From Savannah River and Similar Authorized Locations"(July 8, 1986)	1
25.	R2028	"Procedure for Entrance to the Limited Access Area"(February 7, 1991)	1
26.	R2029	"Procedure for Exit From the Limited Access Area"(June 14, 1989)	0
27.	NR2501	"NPI - Procedure for Decontamination of AECL/Theratronics Teletherapy Machines" (February 5, 1990)	1
28.	NR3001	"Procedure for Changing Spent Pool Resin"(January 21, 1991)	0
29.	NR3002	"Dewatering, Sealing and Shipping 60-Gallon Polyethylene "HICS" Provided by Chem-Nuclear Systems, Inc." (January 22, 1991)	0
30.	NR3003	"Procedure for Use of the Drum Storage Vault"(January 22, 1991)	0
31.	R4000	"Procedure for Canal Operations"(October 20, 1975)	1

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32.	NR4001	"Procedure for Canal Entry"(January 28, 1974)	1
33.	R4002	"Monitoring of Water Loss in the NPI Main Pool and Canal"(January 31, 1974)	0
34.	R4003	"Procedure for Monitoring Canal Tanks"(February 11, 1977)	1
35.	R4004	"Procedure for Monitoring Main Pool Tank"(February 10, 1977)	1
36.	R4005	"Procedure for Testing Canal and Main Pool Leak Detection Channels" (February 11, 1977)	0
37.	R5001	"General Procedure for Hot Cell Operations"(December 15, 1988)	3
38.	R5001A	"General Procedure for Hot Cell Source Operations Where the Canal is Isolated from the Hot Cell"(May 16, 1974)	1
39.	R5002	"Opening the Hot Cell Door After Processing Single and Double Encapsulated Cobalt-60"(July 15, 1976)	1
40.	NR5003	"Opening Hot Cell Door After Processing Exposed Cobalt-60"(July 15, 1976)	1

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41.	R5004	"Transfer of Sources Between Hot Cell and Canal Tanks"(October 20, 1975)	0
42.	R5005	"Loading of Encapsulated Sources in Transfer and Shipping Containers From Hot Cell"(November 26, 1973)	0
43.	R5006	"Processing single and double Encapsulated Cobalt-60 Sources" (November 26, 1973)	0
44.	NR5007	"Procedure for Processing Exposed Cobalt-60"(April 4, 1978)	1
45.	NR5008	"NPI - Procedure for Changing the Primary Hepa Filter in the NPI Hot Cell Ventilation System"(April 12, 1982)	2
46.	R5009	"Procedure for Testing of Hepa Filter in Ventilation System of Hot Cell"(February 17, 1994)	2
47.	R5010	"NPI - Procedure for Changing the Roughing Filter in the Hot Cell Ventilation System"(April 21, 1982)	0
48.	NR5012	"Opening Hot Cell Door After Special Processing Operations with Exposed Cobalt-60"(July 28, 1986)	0

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| 49. | R5013 | "Procedure for the Use and Control of Radioactive Material in Teletherapy Operations"(July 29, 1986)  | 0 |
| 50. | R7901 | "NPI - Procedure for Environmental Qualification Testing"(August 9, 1984)   | 0 |
| 51. | R7902 | "NPI - Procedure for Reporting Defects and Non-Compliance in Environmental Qualification Testing"(August 9, 1984)   | 0 |
| 52. | R7903 | "NPI - Procedure for Correcting Non-Conformances in Radiation Testing"(August 9, 1984)  | 0 |
| 53. | R7904 | "NPI - Procedure for Retention of Documents pertaining to Environmental Qualification Testing"(August 9, 1984)  | 0 |
| 54. | R7905 | "NPI - Procedure for Analytical Methods used in Radiation Testing"(August 9, 1984)  | 0 |
| 55. | R7906 | "NPI - Procedure for Correcting Non-Conformances in the Quality Assurance Plan for Environmental Qualification Testing or Any of Its Implementing Procedures"(August 9, 1984) | 0 |

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56.	R7907	"NPI - Procedure for Control of Documents Pertaining to Environmental Qualification Testing" (August 9, 1984)	0
57.	R8010	"Guideline for NPI Home Employee Contamination Survey" (June 29, 1988)	0
58.	S1	"Special Procedure for Removal and Encapsulation of Failed and Other Selected Sources from Water Storage Facilities" (June 24, 1977)	0
59.	PR 001	"NPI - Program Radiation Protection Employee Exposure" (June 30, 1983)	3
60.	PR 002	"NPI - Radioactive Respiratory Protection Program and Implementing Procedure RP-01" (December 28, 1989)	7
61.	PR 003	"NPI - Requirements for the Documentation of Evaluations of Radiation Exposures" (October 10, 1980)	1
62.	PR 004	"Supplemental Training Program for Radiation Protection Participants" (July 6, 1989)	1

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

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RADIOLOGICAL HEALTH PROGRAM MANAGER II



DEPARTMENT OF THE ENVIRONMENT  
**RADIOLOGICAL HEALTH PROGRAM**  
**RADIOACTIVE MATERIAL LICENSE**

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Supplementary Sheet

License No. MD-31-025-01

Amendment No. 43

**CONDITIONS CONTINUED**

C. Neutron Products Inc. Drawings

1. Location of Dickerson Site, Drwg. No. 120042, dated June 11, 1979
2. Layout of Dickerson Facility, Restricted Area, Drwg. No. AL-120086, 2 sheets dated June 17, 1991
3. Layout of Limited Access Area, Drwg. No. AL-120084, 2 sheets dated June 17, 1991
4. Contamination Control Zones in Limited Access Area, Drwg. No. AL-120085, 2 sheets dated June 17, 1991
5. Shielding Water Systems, Drwg. No. D-220036, Rev. B dated July 10, 1991
6. Limited Access Area Safety Circuits, Drwg. No. N-180012 dated July 18, 1991
7. Pool & Canal Layout, Drwg. No. N-1210055, 2 sheets Rev. E dated June 25, 1991
8. Drum Storage Vault, Drwg. No. N-220033 dated September 28, 1994
9. Resin Storage Vault, Drwg. No. A-220034 dated September 29, 1994
10. Hot Cell Exhaust Filtration System, Drwg. No. D-220037 dated June 26, 1991
11. Area Monitor Locations, Drwg. No. 220035-N Rev. B dated June 21, 1991
12. Location of Environmental Test Wells, Drwg. No. AL-120087 Rev. B dated June 17, 1991

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